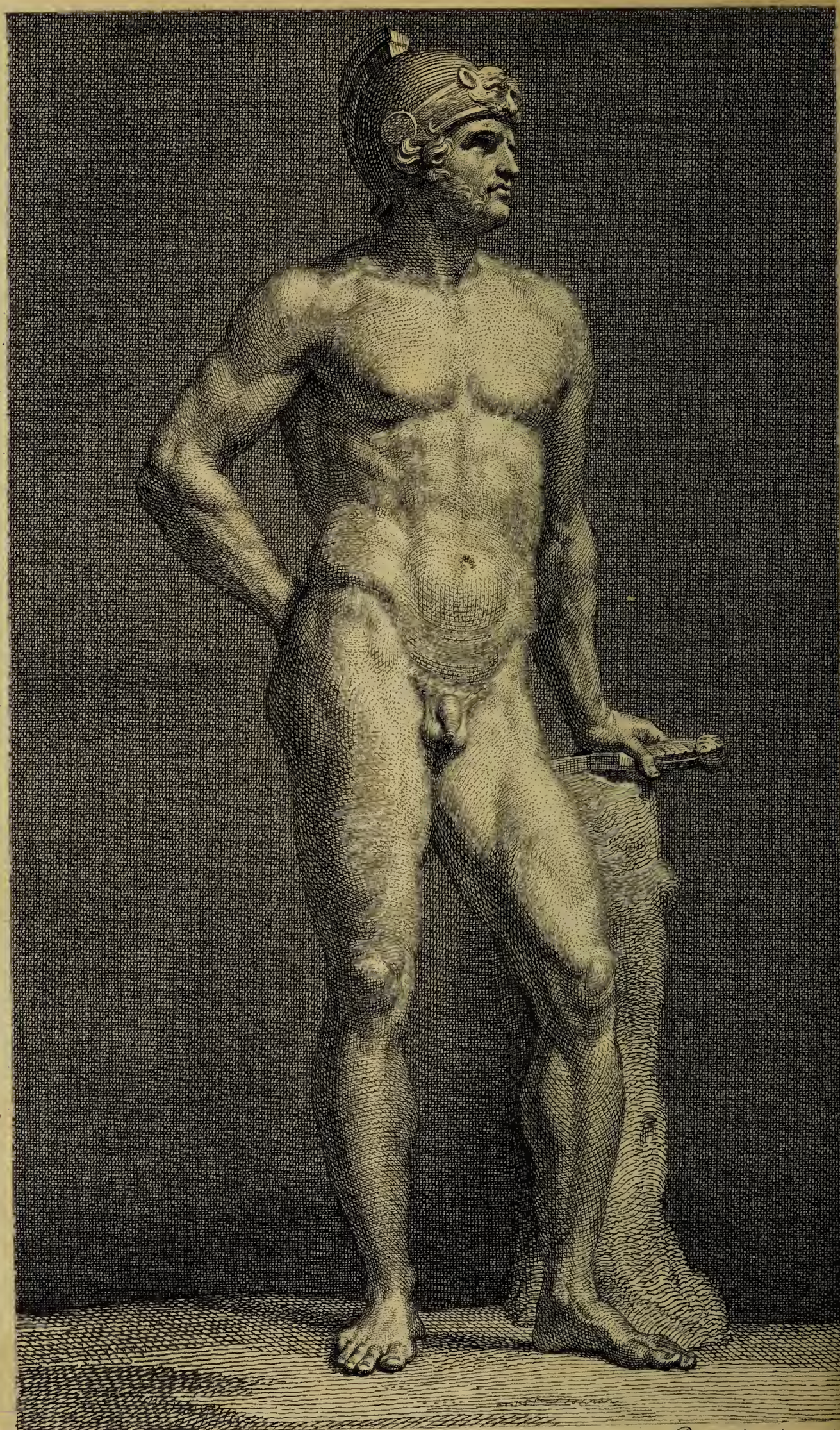
16766.

The Marquis of Stafford.



Palmer delin. *Bartolozzi sculp*

MARS.

From a Statue by M.r Bacon.

16766

TRANSACTIONS

OF THE

SOCIETY,

INSTITUTED AT LONDON

FOR

ENCOURAGEMENT

OF

ARTS, MANUFACTURES, and COMMERCE;

WITH THE

PREMIUMS offered in the YEAR 1787.

VOL. V.

LONDON.

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Messrs. DODSLEY, LOCKYER DAVIS, WHITE, BECKETT, JOHNSON, CADELL, ELMSLEY, WALTER, RICHARDSON and DEBRETT.

(PRICE FOUR SHILLINGS.)

M,DCC,LXXXVII.

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PREFACE.

THE great number of ingenious and reſpectable perſons, who are continually becoming Members of the Society, is a ſufficient proof of the ſatisfaction the Publick feel at the annual appearance of theſe Volumes: And it is the hope of the Society, that the following pages will be found to contain ſome very uſeful information, under each of the ſeveral heads into which the buſineſs is divided.

In Agriculture, the account of the manner of forming a very extenſive plantation in the northern part of England, cannot fail to give pleaſure to all lovers

of that very uſeful branch of cultivation, the growth of Timber; and whoever has peruſed the foregoing volumes of theſe Tranſactions, muſt have ſeen, with great ſatisfaction, the many rewards beſtowed by the Society on Mr White, for his ſpirited and almoſt unequalled attempts, at the improvement of his Eſtate at Butsfield.

Under the ſame Claſs of Agriculture, are alſo inſerted ſome experiments to diſcover a mode of preventing the depredations of the Fly on Turneps; ſhould the efficacy of this method be ſatisfactorily confirmed, by future trials, one of the moſt wiſhed-for objects in farming, will be happily obtained; and it may not here be improper to ſay, that the Society will receive with particular pleaſure, any accounts of experiments made on ſo intereſting a ſubject.

Of

Of the plant recommended in the letter from Thomas Boothby Parkyns, Eſq. it need only be obſerved, that a pamphlet, giving a full detail of its virtues, has been printed on the Continent, from whence great part of the letter, hereafter inſerted, has been extracted; and as a trial of its uſes is now making, on a large ſcale in England, the full merits of it will be ſoon known; in the mean time, it is but juſtice to hint, how much this country is obliged to thoſe Gentlemen, who in their foreign travels, employ their time in ſearching for thoſe things which may prove really valuable to their native land, and generouſly communicate them to the Publick.

A method of deſtroying Ants, Spiders, and other Inſects in hot-houſes and pineries, is laid before the Publick in this volume; and if the inſtructions given are

obſerved, will prove certainly efficacious, but ought to be uſed with caution.

Several attempts have been made, and many contrivances produced, for an eaſy method of cutting ſtraw for feeding cattle; In the following ſheets, a full deſcription and plate of a machine for that purpoſe, of a ſimple conſtruction, and ſmall coſt, is inſerted, which may be uſed by any perſon capable of turning a Wynch, and this is the principle advantage theſe inſtruments have over thoſe that have long been in common uſe throughout the kingdom, in which the various motions required to bring forward and cut the ſtraw into tolerably equal lengths, require a dexterity in the perſon cutting it, which long practice only can give, and therefore cannot be done by common labourers.

Under

Under the head of Agriculture will be found ſome letters on the drill-huſbandry, which relate to experiments made on a ſcale hitherto unattempted, and which ſerve to throw a full light on that intereſting queſtion which has ſo long and ſo often employed the attention and pens of Agriculturiſts, *Is the Drill or Broad-caſt method of culture the moſt advantageous?*

Under the head of Chemiſtry, is inſerted an account of an eaſy and practicable method of ſecuring Stone Retorts from breaking; or ſtopping any cracks in them during an operation. The name of the Author of this paper, who is well known to be an excellent practical Chemiſt, and who has long uſed this method in his elaboratory, is a full aſſurance of the efficacy of the method preſcribed; every one verſed in Chemical experiments and knowing the danger and loſs that frequently follow the

breaking the diſtilling veſſels will think themſelves happy that ſuch a diſcovery has been laid before the Publick.

In the claſs of Polite Arts, a full account will be found of a method of imitating the manner of painting practiſed by the ancients, in which, when experience ſhall have fully proved its ſuperior utility to the common method of painting in oil, the advantage of wax, as a vehicle, will be evident: And here again is another inſtance on record, of the benefit of foreign travel; when the mind of the traveller, as in the caſe of Miſs Greenland, directs itſelf to objects of real utility.

Under the head of Polite Arts, will alſo be found a particular account of the method purſued, at an Academy not far from town, with remarkable ſucceſs, for the inſtruction of young gentlemen in the

Latin

Latin Tongue; the letter from Dr. Egan, ſo fully explains the mode practiſed by him that it is unneceſſary to enter into a more full detail in this place, except it be to obſerve that the proficiency of his pupils was ſuch, as to induce the Society to vary from their uſual procedure, and beſtow more rewards on them, than the words of the advertiſement gave them any reaſon to expect.

In the ſame claſs is given a particular deſcription of a mode of inſtructing blind perſons in muſick, more commodious and extenſive than that commonly employed; and as every humane mind will rejoice at thoſe attempts, which aim at alleviating the misfortunes of our fellow-creatures, and at the ſame time promote the ornamental parts of education, there is no doubt the paper by Mr. Cheeſe, will afford much ſatisfaction.

In

In Manufactures the reader will find two letters on the breeding and feeding Silk Worms, ſhewing the practicability of eſtabliſhing the making Silk to advantage in this climate, and to forward the views of the reverend gentleman to whom the Society is obliged for one of thoſe letters: Some premiums have been thrown out to the publick, for the encouragement of planting mulberry-trees, as the want of food ſeems the only obſtruction to the carrying this deſirable object into full execution.

The other letter on this ſubject, written by Miſs Rhodes, of Bridgnorth, whoſe papers inſerted in the fourth volume of the tranſactions, have already been ſo favourably received, points out, in a forcible manner, ſo certain a mode of preventing any accidents that may ariſe to the Worms, from the change of weather, to which this

country

country is ſubject, that little reaſon remains to doubt the certainty of raiſing, to advantage, the Worms, and carrying on the manufactory of Silk with profit in this Iſland.

Under the head of Mechanicks is inſerted a hiſtory, deſcription and repreſentation of an Hydraulic Machine; this account was written, and the drawings made, by a gentleman of ſuch eſtabliſhed reputation, as leaves a full aſſurance of the utility of the machine, which promiſes to be on many occaſions of great conſequence in very important works.

Few things, particularly in hot climates, are of more importance to the inhabitants, than good methods of preſerving Water, and to thoſe who are acquainted with the nature of that ſpecies of earth called Puzzolana, or Tarris, little need be ſaid to

ſhew

ſhew of what great utility the diſcovery of ſuch a material as is mentioned in the paper under the claſs of Colonies and Trade, will be to the iſland of Jamaica; it is true that earth has been already employed for ſome of the moſt uſeful purpoſes to which it is applicable, by the inhabitants of that iſland, but the nature of it being now made publickly known, other countries trading to Jamaica, may have the advantage of purchaſing it for their own uſes, and to the emolument of the proprietor; for though the diſtance of that iſland, from Great Britain, will perhaps not admit the bringing it to advantage hither; yet, the countries nearer to the place where it is found, will now be informed, where ſo uſeful a material may be procured; and one great end of this inſtitution, the communication of uſeful diſcoveries from one part of the Britiſh dominions to another be anſwered.

Under

Under the different heads of premiums offered for the enſuing year, ſome new ones will be found of conſiderable conſequence, to the improvement of the Agriculture and Manufactures of the kingdom, and particularly under the head of Chemiſtry, a premium has been introduced, for making fine Bar Iron with Pit Coal, an object of the higheſt importance to this country; and which the great improvements made within theſe few years, by the ſpirited exertions of the manufacturers in that branch, render it probable, may, in no great length of time, be accompliſhed. When the large ſums of money ſent to Ruſſia, Sweden, &c. for this neceſſary article, and the immenſe mines of Ore, and Coal in theſe kingdoms, are conſidered; no premium can be beſtowed, by which the good of the country will be more advanced, than for obtaining this great and deſirable End.

And

And here it may be proper to mention, that at length the Society has obtained an object long ſought after by them, that is, a Paper manufactured in England equal to the French, for receiving impreſſions from Mezzotinto and other engraved copper plates, the premium for this article not having been adjudged to the candidate, Mr Bates, of Wycombe-marſh, Buckinghamſhire, until the year 1787; a more particular account is deferred to the next Volume of Tranſactions; ſuffice it therefore to ſay, that all the plates in this volume are taken off on that paper, and the publick are now enabled to form a fair judgmentof it. It may not here be amiſs to ſay, that in order to ſhew to the world atlarge, the merit of that ingenious artiſt Mr Bacon, the Frontiſpiece of this volume repreſents the ſtatue of Mars in the Society's Great room, of

which

which mention has been already made, Vol. III. Page 135; and that full juſtice might be done to that excellent piece of ſculpture, the engraving has been executed by the celebrated Mr Bartolozzi, whoſe works are at this day in the higheſt reputation through Europe.

There remains now only to add, that the Society will be happy to receive any communications that may tend to promote the Arts, the Manufactures, or the Commerce of theſe kingdoms, and thoſe that are found deſerving, will be inſerted in ſome future Volume in a manner that may do credit to the authors whoſe names will thereby be tranſmitted to poſterity as having contributed to the welfare and proſperity of their native country.

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ERRATA.

Page 11 line 1. for *next*, read *first*.

39. 6. for *if you Society will*, read *if your Society will*.

108. laſt line after *fair*, read *water*.

182. 2,3 for *proportinably*, read *proportionably*.

289. at the end, add 1789.

323. 16. for *horizonal*, read *horizontal*.

382. 10. before *Smith*, add *

PAPERS

IN

AGRICULTURE.

AGRICULTURE.

IN the preceding Volumes of the Society's Tranſactions, mention has been made of the large Plantation formed by Thomas White, of Retford, Nottinghamſhire, Eſq; at Butsfield, in the Pariſh of Lancheſter and Biſhoprick of Durham, and accounts given of the ſeveral Medals adjudged to Mr White, for the different kinds of trees planted on that Eſtate: This Year, the Society having received Certificates properly authenticated, by which it appeared, that there had been planted at Butsfield, between the third of February, and the

eighth of April, 1784, thirty-one acres, four perches of land, with thirty-ſeven thouſand two hundred and thirty Alders, from two years old to four; tranſplanted in order to raiſe Timber, which are well fenced round with a good ſtone wall, five feet three inches high, and the trees ſhooting with great vigour. The Gold Medal being the premium offered for planting Alder, was adjudged to Mr. White; from whom alſo the following account of that Plantation, has been received, for which the thanks of the Society were given him.

MR WHITE'S

MR. WHITE'S ACCOUNT

OF HIS

PLANTATION,

AT

BUTSFIELD, IN DURHAM.

RECEIVED, FEB. 2, 1786.

SIR,

AS I have been so happy as to receive many honorary rewards from the Society, for the Encouragement of Arts, Manufactures and Commerce; for planting many different kinds of trees upon my infant estate at Butsfield plantations, in the county of Durham: A sense of

Gratitude for ſuch liberal and diſtinguiſhed marks, of the Society's favour and attention, paid to my feeble endeavours to proſecute ſo uſeful a work, has encouraged me to trouble you with this letter; begging the favour of you, to lay it before the Society, at your leiſure.

The promoting of uſeful knowledge, being their ultimate wiſh, I ſhall be particularly happy, if my letter may in the ſmalleſt degree be acceptable to them, by conveying an account of the progreſs and ſucceſs of my plantations.

As I had long entertained a favourable idea, founded upon obſervation and experience, of the great profits, as well as national utility of planting; and being determined to go upon a large ſcale, both for the important article of ſhelter, as well as for the great ſaving in point of fencing; my plan, being to plant a thou-

ſand

ſand acres, I ſpent ſome time, in looking out for a proper ſubject; the great objects of my reſearches were, firſt, to find a good internal market for the ſale of my wood, and if it ſo happened, an opportunity of exporting it to diſtant markets; ſecondly, to find in ſuch a neighbourhood an eaſy purchaſe of a large tract of freehold land, of ſuch a quality as rendered it of little value for producing corn or graſs, and at the ſame time not unfavourable for the growth of wood, and containing good reſources for making proper fences, and erecting buildings, &c. for protecting it. I was at length happy enough to find a ſubject that promiſed all thoſe advantages, the quantity of acres excepted, which I could not meet with upon ſo large a ſcale as I wiſhed; my firſt purchaſe being no more than two hundred and twenty ſeven acres: but as it lay in the internal part of a large com-

mon of ſeventeen thouſand acres, which was then dividing by Commiſſioners, under an Act of Incloſure; and as that part of the common, from its quality and ſituation, was not likely to become an intereſting object to the circumjacent proprietors, who bordered upon this large tract; and whoſe property in general lay at a diſtance from it, I had good reaſon to believe, that I could accompliſh my plan, by purchaſing near at hand what I had occaſion for at an eaſy rate; and I had ſome time afterwards an opportunity of buying three hundred acres more within the ſhelter of my firſt purchaſe; both which lay within the vicinity of the great national coal works, of which New Caſtle is the port for exportation: and alſo within a marketable diſtance of a large tract of country; through which runs the river Weare, abounding with lead mines, which together with the collieries

lieries create an immenſe conſumption of wood, particularly ſmall wood, the growth of a few years; there is likewiſe a conſiderable demand for wood for many other purpoſes, eſpecially for charcoal.

Many of the natural woodlands, in the county of Durham, were almoſt exterminated, owing to the indiſcriminate mode of cutting them, and the ſhameful neglect of the fences, which expoſed them to the conſtant ravages of cattle, making Wood a very ſcarce and dear article in the country: with theſe advantages before me, happy in the proſpect of benefitting my family, and ſerving my country, in a way ſo agreeable to myſelf; about ten years ago I began to incloſe my firſt purchaſe with a ſtone wall near ſix feet high, which was accompliſhed the ſame year; I alſo built ſeveral cottages, for the protection of my plantation, as well as for the reception of my work people.

The

The ground of this plot, whilſt in a ſtate of nature, was covered over with ling, fern, broom and bad graſs, and ruſhes in the wet places; the high parts of it very bad land, of a channelly quality, and not many inches from a grit ſtone rock: lower down the hills, the land is of a better quality, affording a tolerable depth of ſoil, but was then very cold and ſwampy for want of draining. The features of this incloſure are rather gentle than bold, inclining from the north and ſouth, down to a narrow valley in the middle, which continues from eaſt to weſt, through the adjacent country; over which a ſmall but petulant trout ſtream, wantonly meandered in ſo many ridiculous mazes, as choaked its own progreſs, and rendered the whole of this ſmall valley, containing about eleven acres, of my beſt and moſt ſheltered land, almoſt uſeleſs.

My

My next attention was applied to the conducting it through the ground in an eaſy curving line, filling up the many circumvolutions it had made in its former paſſage; after which, as ſeveral ſprings were contained within it, I laid ſtone conduits to conduct them off to the new water courſe; theſe were made nine inches deep within, ſix inches wide, and laid one foot below the ſurface, that the trees which are planted upon them, might have room to vegetate.

I next proceeded to the paring and burning its rough and wild ſurface of ruſhes, &c. and to the levelling a great number of hillocks that had been thrown up by the water at the time of floods; after which, I trenched up the whole to the depth of eighteen inches, keeping the aſhes raiſed by burning to the depth of about ſix inches from the ſurface,

that

that they might the better promote the vegetation of the young plants; and having reſerved about three acres for a nurſery, which was ſtocked with a large quantity of young ſeedling trees, purchaſed for the purpoſe; I planted the remainder, with the common baſket Ozier, and other aquaticks: the expenſe of the whole of this improvement, was conſiderable; but ſo much land may be truly ſaid to have been made for ever, out of a maſs of rudeneſs, which yielded no profit to its Owner. The new Water-courſe formed an excellent conductor not only to the ſtone drainage made in the valley itſelf, but alſo much aided my ſubſequent operations in the draining the ſides of the hills, from which large currents of water were collected, and brought into the new cut, ſo that it has ſince anſwered in a double capacity.

In

In carefully examining the boggy parts of the riſing grounds, I found the land of two different qualities, which appeared to be ſwampy from different cauſes: The firſt part which fell within my obſervation, and which contained the greateſt quantity of land, was a light hazel earth, mixed with ſtones, had an open grit ſtone rock at the bottom, which lay at unequal depths from the ſurface; out of which iſſued out many very ſtrong ſprings, ſome of them making a very ſingular appearance above ground, from a kind of ſcum or moſs that annually vegetated on the ſurface of the water; and which in the courſe of time, in ſome degree, dammed up the current, and as it accumulated into a maſs, carried up the water along with it, which conſtantly kept diſcharging itſelf out of the ſides of theſe ſpungy quaking hillocks; many of which had ariſen to a conſiderable height,

height, and had often proved the graves of animals, as appeared from the many bones that were dug up, whilſt my people were cutting the drains. It was therefore evident that the bad condition of this part of the ground, was cauſed by ſprings only; theſe were eaſily taken off by digging at their head or ſource, down to that level where the water boiled up and formed one collected ſtream; from which my cuts were made, ſufficient to contain a ſtone conduit, fifteen inches deep, and ſix inches wide, allowing the top of them to be one foot below the ſurface of the ground: all thoſe conduits were directed down the ſides of the riſing grounds, in a direction north and ſouth, to the new water-courſe, in the valley below.

The other kind of boggy land, the quality of which engaged my attention, appeared

peared plainly to proceed from the toughneſs and tenacity of the ground, being a ſtrong ſoil at the top, with a cold clay bottom; under which lay a cloſe bedded rock, whoſe interſtices were alſo fill d with clay; this kind of land ſeldom contains any ſprings, and none were found therein; it therefore became wet from the rain water not being able to find its way through it. This turned out a much more difficult ſubject to improve, than the looſe ſpringy ground above deſcribed, as covered drains made with ſtones would have no effect; the only alternative left me, was to make a number of ſmall open drains, about two feet deep, one foot wide in the bottom, and two at the top, and to carry the ſame longitudinally along the ridges of the riſing grounds; the better to intercept the water in its paſſage downwards, and which I afterwards conducted to the new water-courſe, by ſome few

general

general drains cut at right angles to the former ones.

Having compleated the incloſing and draining my ground, my next buſineſs was the paring and burning about eighty acres more of the deepeſt land, and after the aſhes were ſpread over the ſurface of it, I trenched the greateſt part of it with the ſpade to the depth of fifteen or eighteen inches, the reſt was ploughed very deep; the latter I found the cheapeſt method, and nearly as efficacious as the former. I then began to plant, making choice of the autumn, for the high and barren parts; and the ſpring for the lower and deeper land: On the former ſubject, I chiefly confined myſelf to the planting the hardy natives of mountainous countries; ſuch as the Larch, Pine, and Fir kind, Birch, Geen-tree, and Mountain Aſh, with ſome others; all which

which for the ſake of ſhelter, I planted at two feet aſunder.

Upon the lower and more fertile ground, part of which was prepared as above deſcribed, I planted trees of a more permanent growth, moſt of which would produce a new ſucceſſion from the root after cutting; ſuch as the Oak, Aſh, Elm, Sycamore, Beech, and weſtern Plane; and in the moiſt ground, the Alder, Poplar, and Norfolk-Willow. Theſe trees were planted at proper diſtances, to make a timber wood; and in the intermediate ſpaces, by way of ſhelter as well as profit, all the mountain kinds as above-mentioned, were introduced; moſt of which except the Larch and Geen tree, are intended to be weeded out, after they arrive at a ſaleable age, to make room for the timber-trees: In this part of the ground, the trees were planted at a yard diſtance.

It is well known that the reſinous kinds, ſuch as Larch, Pine, and Fir, are more rapid in their growth, will grow upon worſe land, come to profit ſooner, and afford more ſhelter than the generality of other trees; but it ſhould be always conſidered, that they never ſpring again after cutting; ſo that in the courſe of a few years they arrive at maturity, muſt be cut down and you have the melancholy proſpect of being again preſented with a dreary waſte.

As I propoſe thoſe kinds, the Larch excepted, to remain for timber only, in the higheſt and moſt barren parts of my Plantations, that it may never come under ſo unpleaſant a deſcription, I have there at proper diſtances, attentively planted amongſt them ſome hardy kinds, which propagate themſelves ſpontaneouſly from ſeed; ſuch as the Birch, Moun-

tain

tain Aſh, and Geen tree, &c. the ſeeds of which will be copiouſly ſown, and planted, by the winds and birds, which nurtured by the foſtering ſhade and warmth of the timber trees, will propagate themſelves in every vacancy of the Plantation; and thereby repleniſh the naked ground when the reſinous kinds are cut down and removed.

As I have long found from obſervation, that in unſheltered ſituations thoſe trees thrive beſt, that are not above one foot, or eighteen inches high when planted; as they furniſh a ſhorter lever than taller trees, which by their own force operating with the power of the winds, are conſtantly diſtreſſing the root, by breaking the young fibres, which deſtroys the progreſs of vegetation. To remedy which, it is common for inexperienced planters to place them ſo low

in the earth, as to be in a great meaſure out of the reach of the ſolar influence; a practice equally hurtful to vegetation as well as contrary to the mode in which nature plants her own productions: I therefore always pay more regard to the ſtrength of the ſtem and fibrous ſtate of the roots, than to the height or age of my trees, which were always planted very ſmall, having few luxuriant weeds, or long graſs to ſtifle or pull them down.

I choſe alſo to intermix the different trees in my Plantations, as much as poſſible; not only by way of eſtabliſhing a ſucceſſion in the manner be-before related; but alſo from an opinion, that ground ſo planted will produce more uſeful wood, and that the earth itſelf furniſhes an heterogeneous maſs of matter, containing the proper food, for different

plants

lants to vegetate upon; and that every diſtinct ſpecies draws a peculiar kind of nouriſhment different from the reſt; which is neceſſary for its own ſupport.

If this opinion is well founded, a promiſcuous arrangement of various kinds of trees, muſt be the beſt mode of diſpoſing them; as each kind, will with the more facility, ſearch out and obtain its ſhare of proper nouriſhment, without robbing its neighbours; which being plants of a different genus, will partake of that aliment, which is allotted for their ſuccour: On the other hand, if trees of the ſame kind, and which draw from the earth the ſame ſpecifick nouriſhment, are planted very near each other upon the ſame common bed, they muſt ſoon exhauſt the ſoil of that nutriment, peculiar to their nature, and muſt dwindle of courſe.

I remember an experiment tried ſome years ago, by Mr. Jones, gardener to the Earl of Darlington, at Raby Caſtle, which I think throws ſome light upon this ſubject. He ſowed Peas, which is ſuppoſed to be rather a meliorating than an impoveriſhing crop, for ten years together, upon a piece of rich land; the reſult of this experiment was, that for the firſt two years the crop was abundant; but after that time, it gradually became more and more puny and meagre, ſo much ſo, that on the tenth year of ſowing, the earth was ſo drained of the proper nutriment this plant required, that the Peas would not even vegetate within it, but lay till they became putrid; after which, without any previous manuring, he planted ſtrawberrys upon the ſame ground, which produced an excellent crop.

Some

Some ſpecies of trees draw their nouriſhment very near the ſurface of the earth, and often form a compact web of roots above ground; others occupy the middle ſtratum, and ſome there are ſo hardy as to force their way, not only through the ſtubborn ſoil itſelf, but through ſtones, rocks, and minerals of all kinds, to the depth of twenty or thirty feet or more; which, without paying any reſpect to beauty, ſhews the utility of interſperſing plantations with a variety of different trees, that each may have ſpace not only to find its proper pabulum, but to extend itſelf to that level it moſt delights in; and the whole body of ſoil and underſtratum, in this caſe, inſtead of being partially occupied, will probably furniſh nutrition, and become one interwoven maſs of roots and fibres, as far below the ſurface of the earth as the trees are elevated above it.

Having, in the courſe of about four years, compleated all the abovementioned Works, I began to incloſe my ſecond purchaſe of three hundred acres, with a ſtone wall of the ſame dimenſions as the former. I alſo added many convenient buildings to a farm-houſe, which I found upon the ſpot; erecting ſeveral more cottages, both for the protection of my new plot, as well as to increaſe the number of my labouring people. After this, I proceeded to lay out, about my houſe, a ſmall, but neat farm; which in a few years will be ſecurely defended from the formidable winds of a naked country, by ſurrounding Plantations of conſiderable extent.

This farm, as it may be conſidered the eye of my property, was intended to afford an additional ſecurity to my woodlands; alſo that I might have a future opportunity

portunity of keeping ſome horſes, to carry my wood to the neighbouring collieries, lead mines, &c. as well as to furniſh the little colony of cottagers, I have planted and intend to plant upon my new ſettlement, with Cow-paſtures, Potatoe-garths, Gardens, Orchards, &c. and alſo for the facility and pleaſure of ſeeing and killing the game that are ſuccoured in the adjacent Plantations, and for defending them from neighbouring depredations.

This ſmall farm, I ſubdivided into little fields, with Quick-hedges, and trees planted within them; alſo with belts of wood for internal ſhelter. I next gave it a thorough draining, with ſuch ſtone-drains as were made uſe of in the former plot; I then gave the whole a ſubſtantial, though rather expenſive cultivation: This ground being nearly ſimilar in quality to the firſt plot, with this difference only,

only, that the declivities were fewer and rather more gentle, and the aſpects not quite the ſame. I ſhall therefore not trouble you with the conſequent alterations made in the mode of planting it, as they differed very immaterially from what I have before deſcribed.

Finding the Orchards, in the county of Durham, had been as much neglected as the Woodlands, and that there were but few Apples to be purchaſed in that populous neighbourhood, except thoſe that were imported at Newcaſtle, and other ſea ports; I thought it adviſable to mark out ſome ground, for the purpoſe of planting Apple and Pear-trees. I accordingly made choice of eleven acres, for that purpoſe, which have been ſince planted with all the beſt, and moſt hardy kinds of winter and ſummer fruit, in a favoured ſituation, laying to the ſouth,

and

and embosomed by a large tract of new planted wood. I also made choice of and planted some similar situations, upon a smaller scale, amounting in the whole, to about fourteen or fifteen acres; which compleated the improvements I had planned out for my second purchase, all which were performed in about four more years: the last two have been industriously occupied in replenishing my nursery for the extention of my intended plan of operations, and in renewing with living trees, the vacancies where the first planted ones had died, which were very numerous, from the losses occasioned by a series of bad seasons.

Great attention has also been paid to the eradicating such as did not appear to thrive on particular parts of the ground; and to the replacing them with such kinds as promised more success: this

this buſineſs has been attended to with ſuch a vigilant eye by my fac-totum, at that place, that I believe out of five hundred and twenty-ſeven acres, my ſmall farm included, there is not a yard ſquare of my whole ground but what is occupied by ſome uſeful or ornamental plant; there having been planted and replanted above four million of Trees, amongſt which, beſides the profitable kinds that have been before mentioned: I hope my poſterity will pardon (as an involuntary error in an admirer and ſtudent of nature) the foible of encumbering the ground with many thouſand ſhrubs and plants, which can only furniſh beauty to the eye of taſte, and food to the feathered generation.

I have conſtantly paid an annual viſit to my improvements in the county of Durham, ever ſince they began, until the

the laſt two years, I was prevented by the purſuit of my profeſſional engagements. The laſt Autumn, however, I had an opportunity of ſeeing them, on my road to Scotland. The trees in the firſt Plot, being well rooted in the earth, had made very rapid ſhoots. I muſt acknowledge it gave me much pleaſure to ſee ſo large a ſurface of wood elevated ſome feet higher, ſince my laſt viſit; and I rejoiced to ſee the ſombre unprofitable heath for ever baniſhed, by a gay ſucceſſion of thriving trees, in their autumnal liveries, now ſufficiently high to ſhelter the Planter from inclement winds, and riſing very faſt into property and perfection. My Plantations already begin to be an aſylum for the game; the Pheaſants, Hares, &c. from diſtant woods, have diſcovered a new retreat.

The trees in general flouriſh very well in both plots, particularly the Larch, Birch,

Birch, Geen-tree, Scotch-fir, and Mountain Aſh; amongſt which, the former diſtinguiſhes itſelf very much, being in all places conſiderably larger, and in ſome near twice the ſize of any other kind; and it appears alſo to afford a very ſalutary ſhade and ſhelter, to thoſe trees that partake of its influence: this convinces me of a great error I have committed, in planting Scotch-firs, by way of nurſes, which do not appear to anſwer the intended purpoſe of advancing the growth of the other trees; on the contrary, I find them great tyrants amongſt their neighbours, from the ſtrength and great extent of their branches; alſo from the cloſe covert of the leaves, which not only exclude the air, but prevent a due admiſſion of the rains.

The Larch is not only ſuperior beauty and hardineſs, but furniſhes more

more durable and valuable timber; and is likewiſe a more tender and friendly nurſe to more delicate trees, being furniſhed with a great number of ſmall pliant branches well garniſhed with leaves; and which from their flexible quality, will yield and give place to the adjacent trees, and are not ſubject to laſh and buffet them; they alſo more readily admit the rains, than the Scotch-fir, and are not liable to receive injury in ſnowy ſeaſons, when the branches of the latter are frequently mutilated, and the trees ſometimes totally deſtroyed: the effects of which, I have too fatally experienced.

I think it is probable other planters may have been often miſlead by a miſtaken idea of the ſuperior hardineſs and nurturing quality of the Fir; or from not being acquainted with any other more proper tree to ſubſtitute in its place, have

adopted

adopted it; or I ſhould conceive, they would not have planted ſuch numbers of this truly gloomy and unpleaſant plant: In reſpect to ſhelter, it muſt be allowed to contribute in the winter more than moſt others, particularly the deciduous kinds; but as far as relates to the propagation of the Plantations themſelves, I am of opinion that internal ſhelter at this dreary ſeaſon, when the powers of vegetation are totally locked up, is of much leſs conſequence, than in the more genial months, when the trees are making their ſhoots; the internal warmth of a Plantation muſt then greatly facilitate the operations of nature, and the Larch, being one of the moſt early trees we have in the ſpring, is at that time in full foliage; and I conſider it the moſt promiſing tree I have met with to aid her in that neceſſary work; and as I find it not eaſy to ſeperate pecuniary gratifications from

thoſe

thoſe of taſte, notwithſtanding my general diſlike to the Scotch Firs; I am not ſo much their enemy, as totally to exclude them from my Plantations, as the ſable hue produced by their foliage, has a good effect when properly interſperſed and blended with the more vivid tints of other more pleaſing and lively trees: I ſhall, beſides thoſe that are intended to remain for timber on the barren parts, leave a number of them upon my beſt ground, for the purpoſe of decoration; the remainder I am now exterminating with all poſſible vigour.

The Larch, I have found by experience, will thrive where few other plants will live: The Birch, though no timber-tree, is a uſeful wood, affords great ſhelter, and is almoſt as hardy as the Larch, as I have fully proved at Butsfield Plantations, which in its un-

cultivated ſtate had ſeveral roads over it, ſome of which that lead down the declivities of the hills, had all the ſoil waſhed from them, by the torrents, nearly to the rock; thoſe roads were planted with ſmall trees of different kinds, making uſe of a pick-axe to form the holes for their reception: I alſo planted up all the old quarries, where ſtone had been got, in the ſame way: there being no ſoil, I brought a ſmall portion of earth to each plant, and upon thoſe unfavorable ſpots, where moſt of the other trees had died, theſe plants appear to flouriſh as well as upon a better ſubject.

When I conſider the many virtues of that invaluable and pleaſing tree the Larch, I think it a great misfortune that its introduction into this country, was not of an earlier date: About fifty years ago I am told this Alpine plant,

was

was treated as a tender exotick, and planted out, with the utmoſt care and diligence, in our hot beds and hot houſes; I am every day more convinced of its utility, both from domeſtic and foreign intelligence.

I muſt obſerve, that though there was not a ſingle tree or buſh upon, either of my purchaſes, before I began the improvements, a circumſtance ſoon after happened, which convinced me that wood had grown upon the land; for in digging my drains, the roots of large trees were found, alſo upon the ſurface of the ground, ſeveral very large heaps, containing the cinders of iron ore, which metal this country ſtill produces, and it is probable the ſmelting it, may in barbarous times have been the original cauſe, of the preſent ſcarcity of wood in ſome of the northern Counties; as

there is a tradition prevails amongſt the country people, that the whole of thoſe waſte lands, was once a great foreſt; which was all conſumed in ſmelting the ore, by a kind of foot blaſt, before the invention of better engines; and that the workmen frequently ſhifted their ground as the wood or ore decreaſed, till they had overrun the whole country.

I am making ſome experiments on the texture of the Larch-timber, that I may aſcertain its quality for different untried purpoſes; the reſult of which I ſhall be happy to lay before the Society, at ſome future opportunity; and if I can in any reſpect further their general plan, by a fuller and better explanation; ſo as to throw more light upon this uſeful ſcience, which I humbly conceive has not yet been explored to its fulleſt latitude in this country. I ſhall think myſelf highly

gratified

gratified not only in promoting a work which has ſo warmly and unremittingly excited my ardour, and attention for many years, but ſhall alſo think myſelf much flattered in having the honour to correſpond with a Society of Gentlemen of ſuch diſtinguiſhed liberality and ingenuity.

I am Sir,

Your moſt obedient

humble ſervant,

Mr MORE,

THOMAS WHITE.

Retford, Notts.
Jan. 31, 1786.

The following Experiments and Obſervations on the Culture of Turneps, were communicated to the Society, by GEORGE WINTER, *of* Charlton, *near* Briſtol, Eſq. *and Thanks were returned to him for the ſame. The Drawing or Model of the Drill, mentioned in* Mr WINTER'S *ſecond Letter, has not yet been received, a particular Deſcription of it muſt therefore be deferred till the Publication of ſome future Volume of theſe Tranſactions.*

SIR,

THE very numerous experiments I have repeatedly made, more particularly this ſummer, on Turnep Seed, to prevent being deſtroyed by the Fly, enables me to ſend you my firſt account, and recipe, for the moſt effectual preſervation of that excellent Vegetable.

My

My Turneps have already been inſpected by many Gentlemen in this neighbourhood: Should a member of your Society live near this place, he may examine my numerous experiments, which, if you Society will deem worthy their peruſal, will ſend you an account of the whole, with the particulars of my obſervations on each.

As I have been credibly informed, that Turneps have this ſeaſon been ſowed three times on the ſame ground, as the ſeaſon is ſo far advanced, I think no time ſhould be loſt in ſerving the community.

Your anſwer by return of poſt, will be eſteemed a favor conferred on

Sir,

Your moſt obedient humble ſervant,

Mr MORE. GEORGE WINTER.

Charlton, near *Briſtol*,
July 7, 1786.

P. S.

P. S. Steep Turnep Seed, twenty-four hours or more, in ſufficient quantity of Train Oil. Take a fine ſieve, or linen bag, drain the oil from the ſeed, which mix with a quantity of good earth finely ſifted, immediately drill or ſow. When the plants begin to appear on the ſurface, let the ground be ſowed with ſoot, from eight to ſixteen buſhels per acre.

N. B. Linſeed, or other good vegetable oil, is equally as efficacious, and by draining the oil, a ſmall quantity will be effectual for a large quantity of ſeed—the remainder will ſerve for common uſe, ſuch as for harneſs, &c.

This mode is equally beneficial for every kind of grain, or ſeed ſown in the garden. Time will not permit me at preſent to ſtate my philoſophical reaſons on the ſubject.

Upwards

Upwards of one hundred Gentlemen and Farmers have examined my crops of Grain and Carrots planted by my Machine, which crops are allowed to be far ſuperior to any in this country.

The ſuperior advantages of drilling, are great and many. When the ſeed is depoſited at an inch and a half, or not exceeding two inches deep, it immediately attracts moiſture from the under ſtrata. A proper Machine with a Harrow fixed to it, will ſufficiently cover the ſeed, requires no further harrowing, rolling, nor buſhing. By this mode, the ſoil will be ſo looſe and porous, as readily to admit the dews and influence of the Atmoſphere, by which the tender roots and fibres will freely extend themſelves for nouriſhment. By the common mode of raiſing Turneps, the ſeed is ſowed broad caſt, the ſcorching ſun often injures it

before

before it can be covered; the treading of the horſes by harrowing, buſhing, and rolling, ſo hardens a loamy or ſtiff ſoil, as entirely to exclude the air, dews, &c. and prevent the ſeed from vegetating.—Such are the effects of common Agriculture, not only on Turneps, but every other kind of ſeed, and all ſorts of grain; near half is buried and deſtroyed by the preſſure of the horſes feet, improper dragging, rolling, &c. which I am ſurprized has never hitherto been noticed by any agriculturiſt. Repeated obſervations and experiments have fully convinced me of ſuch a mode being extremely erroneous. At preſent, can only obſerve, that if the Society will eſteem my obſervations and experiments thereon worthy their attention, will with much pleaſure convey them, as time may permit.

Can

Can a perſon at this diſtance be elected a Member of your Society, without perſonal attendance? will you be ſo obliging as to favor me with the conditions, and terms of admiſſion,

SIR,

PERMIT me to acknowledge the receipt of your favour, and to inform you, that Gentlemen who have ſeen Mr. Cooke's and my Machines, aſſure me that mine is far ſuperior to his or any other yet invented—It is ſo ſtrong, that nothing but the greateſt violence can poſſibly injure it—It has been tried on the ſtiffeſt ground, with open Drains fifteen inches wide, and twenty inches deep, which muſt have broke to pieces any inſtrument of leſs ſtrength than mine, and executed extremely well, without receiving the leaſt hurt—Mine has nothing complex in its conſtruction,

is governed by one movement only, and in a few minutes is fully underſtood by any perſon of the meaneſt capacity—By an exceſſive cloſe attention to its executive powers, have lately made more improvements, and am now fully convinced that it is complete.

Will furniſh you with a Model or Drawing as ſoon as poſſible, and I will not heſitate to ſay, that the Drill huſbandry muſt, in a very ſhort time become general, on land where *large ſtones* cannot obſtruct.

I beg leave to preſent you with the particulars of my experiments on Turneps, which I wiſh may be acceptable to the Society.

And am Sir,

Your moſt obedient

humble Servant,

Charlton, Oct. 11, 1786.

GEORGE WINTER.

EXPERIMENTS on early Dutch Turnep-ſeed, ſowed on beds in my kitchen garden, in Drills twelve inches diſtant, one inch and a half deep, on the 11th of *May*, 1786. Theſe beds had been manured with rotten dung, in 1785—After planted with Cabbages.

Remarks made the 26th of *June*.

Stake
No. 1 Seed without any preparation—
No. 4, or 4th beſt.
2 Ditto mixed with ſoot, 3d.
3 with barton draining, 4th.
4 out of dunghill, 2nd.
5 Stale human urine, very few plants appeared
6 Lime and barton draining, none vegetate
7 Soot and water, 2nd.
8 Soot and barton draining, 2nd.
9 Elder leaf juice, 3d.

Stake

Stake

No. 10 Seed mixed with elder and barton draining, 2nd.

11 Ditto and ſoot ſowed over the covered drills, 3rd.

12 Ditto and lime ſowed over ditto, 3d.

13 Ditto mixed with ſlacked lime, very few plants appeared.

14 Seed ſowed, ſcattered ſoot over, then covered, 3d.

15 Ditto ditto ſlacked lime over ditto, very few plants appeared.

16 Elder Buſh drawn over when the plants appeared, 4th.

17 Seed ſteeped in train oil, flouriſhed extremely, 1ſt.

18 Ditto in linſeed oil, rather inferior.

The Linſeed Oil was taken out of a bottle that had contained oil of Turpentine for painters uſe.

N. B. All the ſeeds were ſteeped ſix hours in the different compoſitions.

EXPERI-

EXPERIMENTS on Turneps (Green Norfolk) drilled one inch and a half deep, at one foot diſtance in the rows, on beds eight feet three inches long, and two feet wide—Weight of ſeed, half a drachm to each bed, mixed and ſteeped with ſundry articles as under, to endeavour to aſcertain the moſt effectual remedy for preventing the Fly: Drilled on unmanured ground, the 20th of June, 1786. Marked with Stakes.

No. 1 Seed mixed with half an ounce of dry ſoot, then mixed with a pint of ſifted mould, and drilled.

2 Soaper's aſhes, ditto.

3 Wood aſhes, ditto.

4 Pounded gunpowder.

5 Brimſtone.

6 Slacked lime.

7 Seed ſteeped ſix hours in ſoot, and a quarter of an ounce of train oil, mixed with a pint of ſifted mould.

Stake

Stake
No. 8 Seed ſteeped in Soaper's aſhes, and ditto.
9 Wood aſhes.
10 Gunpowder pounded.
11 Brimſtone.
12 Slacked lime.

13 Seed ſteeped ſix hours in ſoot, and a quarter of an ounce of linſeed oil, mixed with a pint of ſifted mould.
14 Soaper's aſhes, and ditto.
15 Wood aſhes.
16 Gunpowder pounded.
17 Brimſtone.
18 Slacked lime.

19 Seed mixed with brimſtone, and ſalt petre pounded, mixed with a pint of ſifted mould.
20 Seed ſteeped ſix hours with ditto, and a quarter of an ounce of linſeed oil, ditto.

21 Stake

Stake

No.21 Seed ſteeped ſix hours with ditto, ditto train oil ditto.

22 Seed ſteeped ſix hours with brimſtone, and barton draining, mixed with mould.

23 Ditto with linſeed oil.

24 Ditto with train oil.

25 Seed Drilled in, and covered, after ſowed ſoot over the beds.

26 Soaper's aſhes.

27 Wood aſhes.

28 Slacked lime.

29 Seed ſteeped ſix hours in linſeed oil, mixed with mould, and covered, then ſowed ſoot over the beds.

30 Ditto intrain oil, ditto, ditto.

July 17, 1786. Particularly examined all the Beds.—None had entirely eſcaped

the Fly—The leaſt injury was done to No. 30, 29, 24, and 23, which grew ſo luxuriant, as to produce rough leaves ſeveral days prior to the moſt flouriſhing of any other number, and enabled them the ſooner and better to withſtand the Fly's attack.—The linſeed oil, was the ſame as that uſed in the firſt experiment—Its effects were inferior to train oil, which I muſt impute to the drying properties of the Turpentine.—The leaves of the ſeeds ſteeped in oil, were of a much darker green, and appeared twice as thick in bulk and luxuriancy, and the plants were a conſiderable deal larger, than any of the other numbers—In point of luxuriancy, &c. they ſtand as under.

No. 30, 29: 1ſt beſt. Longeſt before, and leaſt touched with the Fly, which,

which in ſome degree impute to the ſoot's being ſcattered over the beds.

24, 23—2nd beſt.

3, 5, 11, 17, 22, 25, 26, 27, 4th beſt.

7, 13, 19, 5th beſt.

All the others far inferior to even No. 5.

Other experiments tried ſince, in July and Auguſt, which cannot at preſent inſert.

The Thanks of the Society, were returned to THOMAS BOOTHBY PARKYNS, Esq; *for the following Letter on the Culture and Uses of the Plant called* Racine de Disette, *and to* Sir RICHARD JEBB, Bart. *for his Care in transmitting to the Society, the Seeds mentioned therein. These Seeds were distributed to several of the Members of the Society; the Plants produced from them flourished well, and are evidently a kind of Beet; but being sown at too late a Season, did not arrive at that Magnitude which might have been expected from the Account given of them. Further Experiments are however now making, the Result of which, will furnish an Article in some future Volume of these Transactions.*

SIR,

I HAVE this instant received Sir RICHARD JEBB's letter concerning the

the Racine de Diſette, and ſend in conſequence a parcel of the Seed, which the Society will honor me by accepting.—I am obliged to ſend it to the Warehouſe immediately, as the Diligence by which it is to go, ſets off to Paris in a few hours—I have therefore no time to tranſlate, or tranſcribe the full directions given by the perſon who introduced it firſt into this country, for the cultivation of the Racine de Diſette; nor to deſcribe its various and profitable uſes. I ſhall content myſelf, as no time ought to be loſt, and that I may not let this opportunity ſlip, being now full late to ſow the ſeed, to ſay that the ſeed ſhould be ſown in the garden, or very good ground, in rows, or broad-caſt, and as ſoon as the plants are of the ſize of a gooſe-quill, to be tranſplanted in rows of eighteen inches diſtance, and eighteen inches a part, one

plant from the other: care muſt be taken in the ſowing, to ſow very thin, and to cover the ſeed, which lays in the ground about a month, an inch only.—In tranſplanting, the root is not to be ſhortened, but the leaves cut at the top; the plant is then to be planted with a ſetting-ſtick, ſo that the upper part of the root ſhall appear about half an inch out of the ground; this laſt precaution is very neceſſary to be attended to. Theſe plants will ſtrike root in twenty-four hours, and a man a little accuſtomed to planting, will plant with eaſe, one thouſand eight hundred, or two thouſand a day. In the ſeed-bed, the plants, like all others, muſt be kept clear of weeds: when they are planted out, after once hoeing, they will take care of themſelves, and ſuffocate every kind of weed near them.

The beſt time to ſow the ſeed is from the beginning of March, to the middle

of

of April; the cultivator however adviſes to continue ſowing every month until the beginning of July, to have a ſucceſſion of plants. The ſeed will get to England ſix weeks or two months too late; of courſe, the leaves will not produce ſo much green forage, nor will the roots be ſo large by five or ſix pounds weight as if they had been ſown at the proper ſeaſon.

I ſhall only add for the preſent, that both leaves and roots, are moſt excellent both for man and beaſt. This plant is not liable, like the Turnep, to be deſtroyed by inſects, for no inſect touches it, nor is it affected by exceſſive drought, or the changes of ſeaſons. Horned cattle, horſes, pigs, and poultry, are exceedinly fond of it, when cut ſmall. The leaves may be gathered every twelve or fifteen Days; they are from thirty to forty inches long, by twenty-two to twen-

ty-five inches broad. This exfoliation, which is properly explained by the cultivator, aſſiſts the encreaſe of the root inſtead of deſtroying it, as it does that of the Beet-root, which it reſembles very much, both in the ſeed and leaves. This plant is excellent for milch cows, when given to them in proper proportions, as it adds much to the quality as well as quantity of their milk; but care muſt be taken to proportion the leaves with other green food, otherwiſe it would abate the milk, and fatten them too much, it is of ſo exceeding a fattening quality.

I have taken ſteps for my receiving in England, any quantity of the ſeed I may want, a precaution very neceſſary, becauſe this plant, like the cabbage, muſt be planted in the ſpring, for ſeed; ſo that the plants of this year 1786, will not produce ſeed time enough for the year 1787.

I intend being in England the firſt or ſecond week in Auguſt, and ſhall be happy to communicate the full directions for the cultivation of this excellent plant, that will be full time enough for every purpoſe the Society can wiſh in the further culture of the Racine de Diſette.

I have the honor to be Sir,

Your moſt obedient

humble Servant,

Mr More.

T. B. Parkyns.

Metz. May 13, 1786.

P. S. I intend ſending another parcel of this ſeed the firſt opportunity, for fear this may miſcarry. Sir R. Jebb, will preſent the ſeed to the Society.

An

An eaſy Method of deſtroying the Red Spider, and other noxious inſects, in Hot-houſes and Pinerys, has long been conſidered as a very deſirable object both to gentlemen and gardeners, and various modes of fumigating ſuch places have been propoſed, and premiums paid by the Society, for that purpoſe; particularly to Mr. GREEN, of Her Majeſty's Flower Garden at Kew, for his invention of a kind of Bellows, contrived by him, and now much in requeſt, and commonly ſold in the ſhops, by which the fumes of burning Tobacco, put into a cavity made in the nozzle of the Bellows, are blown into the places infected.—The following letter from Mr AILWAY, contains a method to obtain the ſame end—but it is hardly neceſſary to add, when the nature and properties of White Sublimate are conſidered,

ſidered, that the waſhing the frames and walls, muſt be done with great care and caution.

SIR,

AS the Society have ſufficiently expreſſed their deſire of finding a method of deſtroying the Red Spider, by having propoſed a premium for that purpoſe, I ſend them an account of an attempt to anſwer that end; made in the hot-houſe of Thomas Clutterbuck, jun. of Watford, Herts, Eſq.

Laſt Summer, this houſe being much infeſted with the Red Spider, I prepared pieces of match, about ſix inches long, the pieces were moiſtened on the outſide with a tincture of Aſſafœtida, in Spirits of Wine, and then rolled in a powder, equal parts of Brimſtone and Scotch Snuff; the gardener was directed to light the pieces,

and

and by means of wires, or other contrivances, place them as near the ground as he could, and behind the frames, &c. at night, and then ſhut up the houſe cloſe. The event was, many were deſtroyed or diſappeared, and very little inconvenience was ſuffered from them, the reſt of the year.

Sometime laſt Winter, I directed the walls of the houſe, frames, &c. to be well waſhed with the following; Take Sublimate four ounces, and diſſolve it in two gallons of water. This hot-houſe was likewiſe greatly infeſted with Ants, not much leſs troubleſome than the Spider; neither Spider nor Ants have been ſeen in this houſe all this Summer; if this method proves effectual, on farther trial, the Society's wiſhes will be gratified I hope to the utmoſt, as the remedy is cheap and eaſily applied.

This

This Waſh may be uſed on old garden walls, and to the roots of trees infeſted with Ants, if made weaker; the experiments I have made, prove that it will deſtroy the tender leaves of ſome plants, though not the roots: One pint and a half, poured four months ago on a ſtandard currant tree, as near the ſtem as I could, has not effected either the leaves or tree itſelf, as far as I can perceive at this time. That this Waſh will be effectual in the deſtruction of all inſects of a tender cuticle, and the ova of moſt others, I am myſelf perfectly convinced, and alſo that it will effectually deſtroy the Spider; I recommend to every gentleman inclined to make the trial, to take care that it be applied with diligence into every crevice of the walls, frames, &c. with a painter's bruſh.

I am Sir,

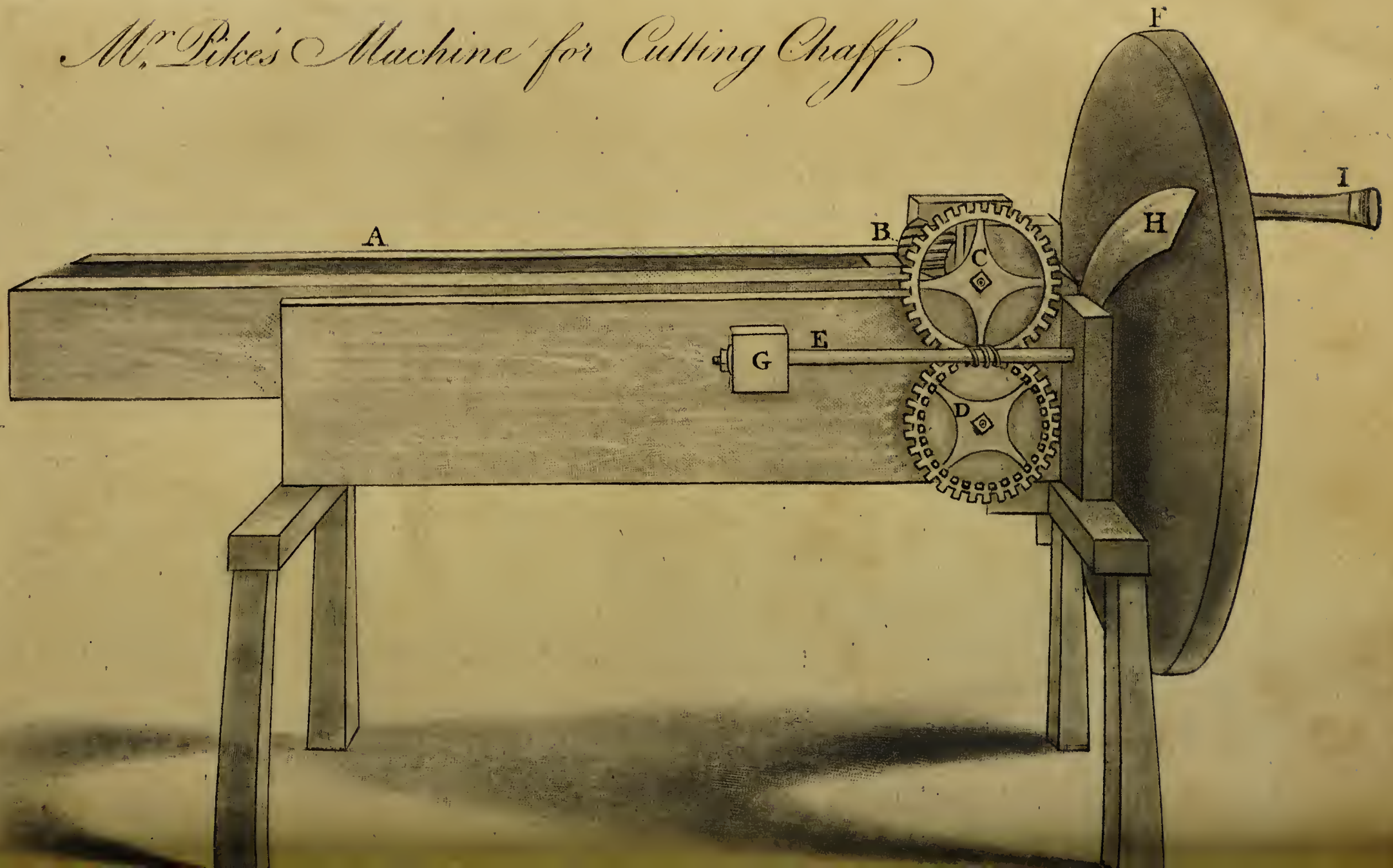
Your very humble Servant,

MR. MORE. JOHN AILWAY.

The advantages of an eaſy and commodious method of cutting Straw, for the feeding horſes, by ſuch an Engine as could be uſed by common labourers, have been long acknowledged, and ſome bounties have been formerly paid by the Society, for attempts to bring ſuch an Engine to perfection; but the chief objection has hitherto been the great price at which they were neceſſarily ſold.

The following letters, and the annexed plate, with the deſcription of an Engine of a ſimple and cheap conſtruction, invented for this purpoſe, by Mr JAMES PIKE, Watch-maker, of Newton Abbot, in Devonſhire, to whom a bounty of twenty guineas was given, will ſufficiently and readily point out to any workman, the nature and principles of his

Mr. Pike's Machine for Cutting Chaff.



his Machine, one of which is reſerved in the Society's repoſitory, for the inſpection of the publick.

Deſcription of a MACHINE FOR CUTTING CHAFF, *made and invented by* JAMES PIKE, *Watch-maker, of Newton Abbot, Devonſhire.*

THE Engine is fixed on a wood frame, which is ſupported with four legs, and on this frame, is a box for containing the ſtraw, four feet ſix inches long, and about ten inches broad; at one end, is fixed acroſs the box, two rollers inlaid with iron, in a diagonal line about an eighth of an inch above the ſurface; on the ends of theſe rollers are fixed two ſtrong braſs wheels, which takes one into the other. On one of theſe wheels, is a contrect wheel, whoſe teeth take in a worm on a large arbour; on the end of this

this arbour, is fixed a wooden wheel, two feet five inches diameter, and three inches thick; on the inside part of this wheel, is fixed a knife, and every revolution of the wheel, the knife passes before the end of the box and cuts the chaff, which is brought forward between the rollers, which are about two inches and a half asunder; the straw is brought on by the worm taking one tooth of the wheel every round of the knife; the straw being so hard pressed between the rollers, the knife cuts off the chaff with so great ease, that twenty-two bushels can be cut within the hour.

SIR,

SIR,

I have invented an Engine for cutting Chaff, on an entire new principle from what was ever, as yet, introduced to the publick, and have accordingly written to ſeveral people to get proper directions to your Society, but could not be informed, until luckily I met with a Mr. Pepperell, of Totneſs, who received a reward from your Society for inventing a Straw or Chip Hat, who gave me the addreſs to you, which induced me to take this liberty.

The Chaff-Cutter is an Engine of old ſtanding; for one ſort, I hear there is a Patent, which I never ſaw—I have ſeen two Engines for the purpoſe, at James Templer, Eſq. at Stover Lodge, in our

neighbourhood, made by Mr. Sharp, of London, at twelve guineas each: their complicated conſtruction, the noiſe they made in working, and their high price, gave me a general diſlike to them; and I have, by a ſteady perſeverance, I think brought one to perfection; it does its work more ſpeedily and eaſy, and is not only original, but ſimplicity itſelf: it will cut twenty-two buſhels per hour, and makes no more noiſe than is cauſed by the knife paſſing through the Chaff, and its price will not be one half that of Mr. Templer. This gentleman, the inſtant he ſaw mine, was ſo pleaſed with its conſtruction, that notwithſtanding he had theſe two valuable ones already, ordered one of me.

It has been examined by ſeveral of our moſt reſpectable gentlemen, viz. Sir James Wright, Sir Robert Palk,

Sir

Sir Thomas Carew, John Cholwich, Eſq. and Colonel Grenfield, of the Horſe-guards in London; who have all expreſſed their opprobation, and ſay it ſurpaſſes all they ever ſaw, both in its ſimplicity and diſpatch of work; the former gentleman ſtrongly perſuades me to have a patent for it, to ſecure the ſale to myſelf, as he does not think it otherwiſe poſſible for me to be paid as I ought; for as ſoon as it appears to the eyes of the workmen, it will be taken from me, and others will reap the advantage of my invention: but as I have a large family, and nothing but my own hands to earn maintenance, cannot think of taking out a patent.

Hope that any informality in the manner I have taken, will be overlooked. I am prompt, to aſk your advice, how I ſhall conduct myſelf ſo as to benefit my family, as well as the Community in ge-

neral? An anſwer by the return of poſt, with your advice, whether you think it worth my coming up with it, will be a favour gratefully acknowledged,

By Sir,

Your moſt humble Servant,

JAMES PIKE.

Newton Abbot, Devon.
Jan. 20, 1786.

Deſcrip-

Deſcription of the PLATE of Mr. PIKE'S *MACHINE FOR CUTTING CHAFF.*

A. the box, into which the ſtraw is put.

B. The upper roller, with its diagonal projecting ribs of iron, the whole moving by the revolution of the braſs wheel C. on the axis of which it is fixed.

D. a braſs wheel, having upon it a face wheel, whoſe teeth take into the endleſs ſcrew on the arbor E, while the teeth on the edge of this wheel, enter between thoſe on the edge of the wheel C.

On the axis of the wheel D. is a roller with iron ribs ſimilar to B, but hid within the box.

E. The arbor, one of the ends of which being made ſquare and paſſing through a mortiſe in the centre of the wooden wheel F, is faſtened by a ſtrong ſcrew and nut; the other end of this arbor moves round in a hole within the wooden block G.

H. the knife, made faſt by ſcrews to the wooden wheel F, and kept at the diſtance of nearly three quarters of an inch from it by means of a ſtrip of wood of that thickneſs, of the form of the blade, and reaching to within an inch of the edge.

I, the handle mortiſed into the outſide of the wooden wheel F.

AMONG the Preſents received by the Society, in the Year 1786, were two Machines the one named *The new invented patent univerſal Sowing Machine*, by Mr. John Horn, of Dover, Kent; the other called *A Patent Drill Machine*, invented by the Reverend James Cooke, of Heaton-Norris, near Manchester, with which alſo was received a new conſtructed Hand Hoe, invented by the ſame gentleman.

As patents were granted for each of theſe Machines, the Society, conſiſtently with their rules and orders, could take no farther notice of them than to return thanks to the inventors for the preſents; and as full deſcriptions of the Machines have been already ſeveral times printed, the publick are ſufficiently poſſeſſed of the

knowledge of their different conſtructions.

The Machines at large are reſerved in the Society's repoſitory.

No accounts have hitherto been received of any experiments made with Mr. Horn's Machine, but of that invented by Mr. Cooke great uſe has been made in different parts of the Kingdom, with what ſucceſs will appear from the peruſal of the following letters; and as a full inveſtigation of the comparative advantages of the Drill and Broad-caſt Huſbandry, has long been a ſubject of attention, both by the public at large, and the Society, it is preſumed the following communications will tend to elucidate that matter.

The Society has been favoured with ſeveral other accounts of the advantages

tages arising from the use of the Drill mentioned in the following papers; but the two annexed letters are judged sufficient for the present publication, and thanks were returned to Mr. Malcolm, and Mr. Boote, for the judicious observations and accurate accounts of the experiments contained therein.

SIR,

Kennington Nurſery, Surry,
Dec. 22, 1786.

Dear Sir,

I Beg the favour of you to lay before our honourable Society, an experiment on a ſmall ſcale, of the comparative difference between the Broad-caſt and Drill Huſbandry, which I think deſerves to be made known.

The land on which the Oats were ſown had been dunged the year before, and a crop of garden Beans and Turneps produced thereon; about the end of February the ground was ploughed, and lay in furrows until the 24th of March 1786, on which day it was harrowed, and the ground ſown. I beg leave here to obſerve, that when the land was ploughed, and which is only two

Acres,

Acres, I had no intention to try any experiment on it, or I would have divided the lands equally: It was plowed in three ridges or lands, agreeable to the incloſed plan. No 1, 2, 3. I made choice of No. 2. being the middle piece, for ſowing Broad-caſt; that no exception might be taken as to the quality of the land. I began with the Drill Machine on No. 1. which for want of practice, took up one hour and half; then No. 2. Broad-caſt, which we ſowed and harrowed in forty-five minutes: then No. 3, took up an hour and half; the whole crop came up very well, but the Drill appeared much the moſt regular, ſtronger, and of a more verdant colour.

On the 17th of May, I ſet two men to hoe the drilled crop, both experienced in hoeing every ſort of crops, the one with Mr. Cooke's Hoe, the other

ther with the common one. Cooke's hoed one fourth more ground in the ſame time than the common one; but the man ſaid, it was much harder work. I paid them at the rate of three-ſhillings per Acre, nor did I perceive any material difference in the performance, both being very clean and became the admiration of every paſſenger.

On the 27th and 28th of July, the whole was reaped, and in a few days was houſed without any rain; each parcel was thraſhed ſeperate, and the contents of each were agreeable to the plan.

If upwards of forty years experience in Agriculture, and an acquaintance with every Machine that has been tried before this honourable Society, I may be permitted to give an unbiaſſed opinion on this experiment, it would be greatly in favour of Drill Huſbandry, and particularly

cularly of Cooke's Machine, it being the only one I have ever ſeen that depoſits the grain of an equal depth, delivers evenly, and covers it properly; any grain thus treated has an indiſputable advantage over the Broad-caſt, even in land that is fine, but the difference muſt be very great in land whoſe ſurface is uneven and rough; in the one, the grain is very partially covered, and conſequently comes up at different times, and hence the crop is of an uneven height, and unequal as to ripening as well as to the ſize of the grain; on the contrary, thoſe that are drilled come up at the ſame time, keep equal pace, and all ripen together, are clean, free from weeds and graſs, and require much leſs time to dry the ſheaf, and the operation of thraſhing is of courſe much ſooner performed; beſides the opportunity it gives farmers to clean their ground that is either foul of weeds or graſs.

I alſo ſowed Garden Creſs and Muſtard, with the Machine, and although the ſmalleſt cups were much too large, and depoſited more ſeed than was neceſſary, yet the produce was nearly double I ever had from Broad-caſt. In the year 1785, I loſt the crop of eight Acres of Oats, and two Acres of Creſs and Muſtard, in Broad-caſt, which had they been drilled, I am ſatisfied would have produced a good crop.

If the foregoing obſervations ſhall tend in any degree to further the deſigns of the Society, with regard to Drill Huſbandry, and in particular relative to the Machine invented by that ingenious man Mr. Cooke, my end will be fully anſwered, and any other information the Society may require at any time, will with great pleaſure be communicated by

Dear Sir,

Your moſt obedient Servant,

Mr. More.

Wm. Malcolm.

No 1. Drilled. contents 80 rods. ſowed 1 buſhel and half. produce 35 buſhels.
No 2. Broad-caſt. contents 80 rods. ſowed 2 buſhels and half. produce 31 buſhels.
No 3. Drilled. contents 1 acre. ſowed 2 buſhels and quarter. produce 74 buſhels.

Athurſton upon Stower, near Stratford upon Avon, Warwickſhire. Decr. 9, 1786.

GENTLEMEN,

THE encouragement held out by your very laudable Society for the Encouraging of Arts, Manufactures, and Commerce, for various improvements, induces me to ſubmit to your candid conſideration, the following circumſtances in Agriculture.

For ſeveral years paſt, I have made uſe of the common ſingle Drill, for Beans, which has been productive of an uniform ſuperiority in a comparative view with Broad-caſt.

In the year of 1784, I was diſpoſed to make an experiment in drilling Wheat, when a ſervant of the Rev. Mr. Cooke, of Heaton-Norris, near Mancheſter, happened

pened accidentally to paſs by on the road, by the ſide of my land, with one of the ſaid Mr. Cooke's new invented Drill Machines. I requeſted him to make an experiment, which he did upon a land, or ridge; the adjoining land of equal ſize, I had drilled with a ſingle Drill, and the remainder of the field ſown Broadcaſt. At harveſt, there was a decided ſuperiority in favour of the land drilled with Mr. Cooke's Machine. In particular it had this advantage over the ſingle Drill, that the ſeed was not buried, nor cruſhed in the delivery, the diſtribution more regular, and the depth more certain.

This Machine, at firſt ſight, appeared to be rather complex and difficult to uſe, but on its being ſet to work, and its conſtruction more maturely conſidered, I ſoon found it to be the very reverſe. The depth that ſeed ſhould be depoſited in the

land, I have found by experience, to be of the utmoſt conſequence to all crops of corn; in this inſtance, the conſtruction of the Machine has ſingular merit; for whether it is at work upon a level, or upon riſing, or falling ground, or on a ſide ſlip, the depth that ſeed ſhould be depoſited, is readily fixed, even in ſoils of different textures, and that by common huſbandmen, of which I have had ample proof from my own ſervants. The delivery of the ſeed, and regularity of the diſtribution, are not leſs curious than they are ſimple, and certain. In the former inſtance, the ſeed is in no danger of being bruiſed or cruſhed; in the latter, the quantity per Acre, is buried at pleaſure.

In this light, the Machine appeared to me on firſt ſeeing it ſet to work, and that I was not wrong in my conceptions

of it, my experiments upon a large ſcale, ſince that time, have exhibited undoubted teſtimony to all my neighbours, and ſeveral hundreds of gentlemen, and reſpectable farmers, who came from far to view my crops.

At Wheat ſeedneſs in 1785, having purchaſed a Machine, I drilled eighty acres with Wheat, the promiſing appearance of which, in the ſpring of 1786, encouraged me to drill all my Barley, being one hundred and twenty acres; alſo ſixty acres of Beans, twenty acres of Peas, twenty-eight acres of Oats, and ſixty acres of Turneps; in all, three hundred and ſixty eight acres: The reſult of the above experiments I have incloſed, having aſcertained them with the greateſt accuracy, by reaping and thraſhing ſeparately, the produce of one land or ridge of each crop, in a fair average part of

each field, except the Oats and Turneps; the former were inadvertently omitted to be aſcertained; the latter were moſtly deſtroyed by the fly, as well as thoſe that were ſown broad-caſt.

During the ſowing of the above crops, an accurate account was taken of the quantity of ſeed that was expended; which being compared with the quantity that is commonly ſown broad-caſt, I found that I had ſaved upwards of one hundred and fifty pounds, in the article of ſeed, every ſhilling of which it was my intention to have laid out in hoeing the above crops, but the ſeaſon for hoeing was too ſhort to admit of it. Notwithſtanding which, by a ſtrenuous and active exertion, I had moſt of my drilled crops well hoed; an accurate eſtimate of which, I could not conveniently take, having at one and the ſame time, not leſs than one

hundred

hundred men, women and children, employed in hoeing; but from the beſt calculation I can make, each hoeing will coſt upon an average, from one ſhilling and threepence, to one ſhilling and ſixpence per acre, with a Hoe invented by the ſaid Mr. Cooke; but ſuppoſing the expence of hoeing, and cleaning the land from weeds, to be ſomething more than I have ſtated, and ſuppoſing the advantages of drilling to be as great, or greater than any one would imagine, I am perfectly ſatisfied that the advantages of hoeing, are upon the whole, ſuperior to thoſe of drilling; having reaſon to believe from the cleanneſs of my land, that where I ſhall have one weed in my next crop, I ſhould have had thouſands from the ſeeds of the weeds of my laſt crop, if I had not cut them up in their infancy by the hoe; but to exhibit in a clear light, the full advantages of hoeing, I preſume,

recourſe muſt be had to a number of experiments to be made upon the ſame land, for a number of years ſucceſſively. This, to be put in practice, by drilling and hoeing next year, the ſame land as was drilled and hoed this year, and by ſowing broad-caſt next year, the ſame land which was ſown broad-caſt this year; continuing the ſame practice for four, five, or ſix years ſucceſſively; at the expiration of which time, I have reaſon to believe, that the land which has been drilled and hoed as above, will produce a tolerable crop, and the land which has been ſown broad-caſt with common weeding only, will produce little elſe but a fleece of weeds. If the reſult of this experiment ſhall favour my expectations, I ſhall bid adieu to ſummer fallow, which indeed I have nearly done already, by carefully avoiding to take two exhauſting crops together, and as

care-

carefully ſtudying to take an exhauſting and an ameliorating crop alternately.

I have thus impartially repreſented to you the effects of the ſaid Mr Cooke's well conſtructed Drill Machine, on three hundred and ſixty-eight acres, which is more than I ever heard of being drilled by one perſon in one year.

And am,

Your moſt obedient humble ſervant,

JOHN BOOTE.

N. B. I have now growing one hundred and twenty acres of drilled Wheat, of a very promiſing appearance.

THE great and ſtriking Difference in the crops No 3, and 4. occaſioned the Committee of Agriculture, to whoſe conſideration the ſeveral accounts were referred, to order a Letter to be written to Mr Boote, requeſting him to inform the Committee, what he thought occaſioned the very great difference in the two experiments, No 3, and 4. as they ſeem to have been made on the ſame ſoil; and whether there are any other cauſes than the one having been ſown broad-caſt and the other drilled.

In anſwer to this enquiry, the following Letter was received from Mr Boote.

SIR

SIR,

NO. 3, and 4. is one field about thirty acres, part of a farm I have occupied from Michaelmas, 1783, and has from that time been cultivated and managed alike, taking an exhausting and an ameliorating crop, alternately: The part sown broad-cast, with two bushels and half of Seed to the Acre, which was the customary quantity, had a much better appearance than the drilled, until the first and second hoeing had taken place in the Spring: another reason is, I think the broad-cast, was over-burthened with seed, at an improper depth; the plants not having sufficient room to thrive, which was apparently the reverse with the drilled. I hope the above will prove satisfactory to the committee. I am Sir,

Your very humble Servant,

JOHN BOOTE.

Atherstone upon Stower,
Jan. 26, 1787.

PAPERS

Account of the different Sorts of Grain, produced from Seed ſown by the Rev. Mr. COOKE's Patent Drill, on the Eſtate of Mr. JOHN BOOTE, of Atherſton, near Stratford upon Avon, in the County of Warwick, in the Year 1786.

		Land meaſured A. R. P.	Produced Buſh. Gal. Pts.	Produce per Acre Buſh. G. Pts.
N° 1	Wheat growing upon a loamy ſand after Beans,	0 1 31	20 6 7	47 0 0
2	Wheat growing upon cold clay after Beans,	0 1 29	19 2 1	44 5 4
3	Wheat growing upon cold clay after Beans,	0 2 22	16 2 2	25 4 2
* 4	Wheat ſowed, broad-caſt in the ground after Beans	0 2 4	5 0 1	9 4 4
5	Peas growing on light ſand after Barley,	0 1 23	19 6 2	50 2 1
6	Barley growing on light ſand after Turneps,	0 2 31	53 1 1	72 4 1
7	Beans growing on loamy ſand after Barley,	0 2 4	19 0 5	36 2 4

The above Account was ſurveyed, and the Workmen examined by me, JOHN TOWNSEND.

Stratford upon Avon,
Dec. 9, 1786.

* Of an inferior Quality.

PAPER

IN

CHEMISTRY.

CHEMISTRY.

PERSONS employed in performing Chemical Operations, whether on the large ſcale of Buſineſs, or as experiments only, will readily ſee the benefit that muſt accrue to them, from the knowledge of an eaſy, cheap, and expeditious mode of ſtopping any cracks, that happen during a proceſs, in the earthen veſſels employed in ſtrong fires.

The following Paper, which is the reſult of many years experience, and has been confirmed by trials in different

ferent laboratories, will therefore prove highly acceptable to all employed in Chemical purſuits, for the compoſition therein mentioned, has been tried on crucibles employed in melting Metals, and has been found to ſucceed.

The loſſes frequently ſuſtained by workmen, by the cracking of thoſe veſſels while the metals within them are in a fluid ſtate, render the diſcovery of a method of preventing ſuch accidents of great conſequence in many of our valuable manufactures.

The Thanks of the Society were given to Mr. Willis, for the following Letter and Paper on this intereſting ſubject.

GENTLEMEN,

GENTLEMEN,

AS you have long been the patronizers of merit and induſtry; give me leave to offer to your conſiderations, a ſucceſsful method of preventing Stone Retorts from breaking, during any operations in the fire, or ſtopping them inſtantaneouſly when cracked; even in the ſtrongeſt heat.

As I imagine it may be of great utility to ſpeculative, as well as practical Chemiſts; I ſubmit it to your opinion, whether you think it worthy publication.

I am Gentlemen,

Your obedient humble Servant,

THOMAS WILLIS.

Hermitage, Wapping,
April 28, 1785.

A Method for preventing Stone Retorts from breaking; or ſtopping them when cracked, during any Chemical Operation, without loſing any of the contained Subject.

I Have always found it neceſſary to uſe a previous coating for filling up the interſtices of the earth or ſtone, which is made by diſſolving two ounces of borax in a pint of boiling water, and adding to the ſolution as much ſlaked lime as will make it into a thin paſte; this, with a common painter's bruſh, may be ſpread over ſeveral retorts, which when dry, are then ready for the proper preſerving coating.

The intention of this firſt coating is, that the ſubſtances thus ſpread over, readily vitrifying in the fire, prevent any

any of the diſtilling matters from pervading the Retort, but does in no wiſe prevent it from cracking.

Whenever I want to uſe any of the above coated Retorts; after I have charged them with the ſubſtance, to be diſtilled, I prepare a thin paſte, made with common linſeed oil and ſlacked lime well mixed, and perfectly plaſtic, that it may be eaſily ſpread: with this let the Retorts be covered all over except that part of the neck which is to be inſerted into the receiver, this is readily done with a painter's bruſh; the coating will be ſufficiently dry in a day or two, and they will then be fit for uſe.

With this coating, I have for ſeveral years worked my Stone Retorts, without any danger of their breaking, and have frequently uſe the ſame Retort four or

five times; obſerving particularly to coat it over with the laſt mentioned compoſition every time it is charged with freſh materials: Before I made uſe of this expedient, it was an even chance, in conducting operations in ſtone and earthen Retorts, whether they did not crack every time; by which means great loſs has been ſuſtained.

If at any time during the operation, the Retorts ſhould crack; ſpread ſome of the oil compoſition thick on the part, and ſprinkle ſome powder of ſlacked lime on it, and it immediately ſtops the fiſſure and prevents any of the diſtilling matter from pervading; even that ſubtile penetrating ſubſtance the ſolid Phoſphorus will not penetrate through it. It may be applied without any danger, even when the Retort is red hot; and when it is made a little ſtiffer, is more proper

for

for luting veſſels than any other I ever have tried; becauſe if properly mixed, it will never crack; nor will it indurate ſo as to endanger the breaking the necks of the Veſſels when taken off.

As the above method of preſerving Retorts may be of ſingular ſervice to philoſophical Chemiſts, as well as thoſe who practice the ſcience for commercial purpoſes; it is my wiſh it ſhould be generally known; as many curious operations may be carried on with greater ſafety, and at an eaſier expence. I have communicated it to the Duke de Chaulnes, who no doubt will make it known to the French Chemiſts; and ſhall be happy to hear of its being of advantage to a ſcience ſo much cultivated in the preſent age.

PAPERS

IN

POLITE ARTS.

POLITE ARTS.

THE well known diſadvantages that Paintings in Oil lie under, have rendered the diſcovery of ſome other Vehicle an object of attentive enquiry among the learned; and diſſertations have been written on the ſubject, by various Authors, as Count Caylus, Muntz, &c. &c.

Wax has been univerſally conſidered as the moſt likely ſubſtance to ſupply the place of the Oil, and moſt of the writers have recommended the uniting it, with Alkaline Salts, into a kind of Soap for that purpoſe; the impro-

priety of ſuch a meaſure, is evident to any one, in the leaſt acquainted with the properties of thoſe Salts.

The method made uſe of by Miſs Greenland, provides againſt all thoſe inconveniences, and the brilliancy of the colours in the Picture painted by her, and exhibited to the Society, fully juſtifies the opinion, that the Art of Painting in Wax as deſcribed in the following letter and account, highly merited the reward of a Gold Pallet, voted to Miſs Greenland on this occaſion.

SIR,

SIR,

I Was extremely fortunate, when at Florence the ſummer before laſt, in the acquaintance of an *Amateur* of painting, who procured me the ſatisfaction of ſeeing ſome paintings in the ancient Grecian ſtyle, executed by Signora Parenti, a profeſſor at that place, who received her inſtructions from a Jeſuit, at Pavia, the perſon who made the fartheſt diſcoveries in that Art. My friend, knowing I was fond of painting, very politely informed me what were the materials the Paintreſs uſed, but could not tell me the proportions of the compoſition; however, from my anxiety to ſucceed in ſuch an acquiſition, I made various experiments, and at laſt obtained ſuch a ſufficient knowledge of the quantities of the different ingre-

ingredients, as to begin and finiſh a Picture, which I ſhall be happy to lay before the Society for their inſpection.

As I muſt ever conſider myſelf greatly indebted to the Society, for the many honours received from them; ſhould you approve of the diſcovery being mentioned to the Society, and they think it worthy their attention, I ſhall be extremely happy in giving them a particular account of the manner in which I accompliſhed my undertaking.

I am, Sir,

Your much obliged

and obedient humble ſervant,

EMMA JANE GREENLAND.

Nov. 14, 1786.

Mr MORE.

THE

THE ANCIENT GRECIAN METHOD OF PAINTING.

TAKE an ounce of white Wax, and the ſame weight of Gum Maſtick in Lachrymæ, that is, as it comes from the tree, which muſt be reduced to a coarſe powder. Put the Wax in a glazed earthen veſſel, over a very ſlow fire, and when it is quite diſſolved, ſtrew in the Maſtick, a little at a time, ſtirring the Wax continually, until the whole quantity of Gum is perfectly melted and incorporated; then throw the paſte into cold water, and when it is hard, take it out of the water, wipe it dry, and beat it in one of Mr Wedgwood's mortars, obſerving to pound it at firſt in a linen cloth to abſorb ſome drops of water that will remain in the paſte, and would prevent the poſſibi-

lity

lity of reducing it to a powder, which muſt be ſo fine as to paſs through a thick gauze. It ſhould be pounded in a cold place and but a little while at a time, as after long beating, the friction will in a degree ſoften the Wax and Gum, and inſtead of their becoming a powder they will return to a paſte.

Make ſome ſtrong Gum Arabick water, and when you paint, take a little of the powder, ſome colour, and mix them together with the Gum-water. Light colours require but a ſmall quantity of the powder, but more of it muſt be put in proportion to the body and darkneſs of the colours; and to black, there ſhould be almoſt as much of the powder as colour.

Having mixed the colours, and no more than can be uſed before they grow dry, paint with fair ater, as is practiſed

tiſed in painting with water colours, a ground on the wood being firſt painted of ſome proper colour prepared in the ſame manner as is deſcribed for the picture; Walnut-tree, and Oak are the ſorts of wood commonly made uſe of in Italy for this purpoſe. The painting ſhould be very highly finiſhed, otherwiſe, when varniſhed, the Tints will not appear united.

When the painting is quite dry, with rather a hard bruſh, paſſing it one way, varniſh it with white Wax, which is put into an earthen veſſel, and kept melted over a very ſlow fire till the picture is varniſhed, taking great care the Wax does not boil. Afterwards hold the Picture before a fire, near enough to melt the Wax, but not make it run; and when the varniſh is entirely cold and hard,

hard, rub it gently with a linen cloth. Should the varniſh bliſter, warm the Picture again very ſlowly, and the bubbles will ſubſide.

When the Picture is dirty, it need only be waſhed with cold water.

In

In the Year 1783, *The Society, conſidering the Education of Youth, a Matter of the utmoſt Importance, and reflecting on the great Length of Time uſually employed in the Study of Languages, offered the following Premiums;*

TO THE MASTERS OF ACADEMIES OR SCHOOLS.

Teaching Languages.

WHereas it has been obſerved that the living Languages, or Languages ſpoken in Schools, are much ſooner acquired than the dead Languages, which are only taught grammatically.

The Society, deſirous to improve the preſent mode of Education, hereby offers the Gold Medal to the Maſter of any Academy, or School for boys, ſituated within,

or

or not more than thirty miles diſtant from London, who ſhall within three years, from the date of this advertiſement, teach the greateſt number of Scholars, not leſs than four, to write, and to ſpeak Latin, in common converſation, correctly and fluently.

Alſo the Gold Medal, for teaching in the like manner, each of the following Languages, viz. the German, the Spaniſh and the Italian, being commercial Languages, not uſually taught at Schools in England.

The Maſters who propoſe being Candidates for the above Premiums, are to ſend notice of their intention to claim them, to the Society, at their houſe in the Adelphi, on or before the ſecond Tueſday in November 1786; ſoon after which, the Society will appoint a day for examining

ing the young gentlemen, and for adjudging the ſaid claims.

And in order to encourage aſſiduity in the ſcholars, whoſe maſters apply for the above premiums, the Society will give to the greateſt proficient in each of the ſaid Languages, the Silver Medal.

On the 19th of December 1786, the Time appointed for adjudging the Claim; Dr. Egan *attended the Committee, having with him five Pupils whoſe Names were*

Maſter Richard Burleigh, aged 15 years.
John Wilſon, 11
Thomas Thomaſon, 12
George Wm. Mc. Donald 12
John Redcroſs, 15

Theſe Pupils were examined by the Committee, and having each of them ſeperately made a Tranſlation of a Paper written for the

purpoſe, and anſwered ſatisfactorily in Latin, ſuch Queſtions as were aſked them.

The Gold Medal, *being the Premium offered, was adjudged to* Dr. Egan—*A* Silver Medal gilt, *to* Maſter Richard Burleigh, *and a* Silver Medal, *to each of the other young Gentlemen who had given the fulleſt ſatisfaction through the whole of their Examination.*

Some Time after the Adjudication of the Premiums, the Society received the following Letter from Dr. Egan, *which as it contains uſeful information of his improved method of teaching Latin, and will tend to promote the deſign of the Society, in the propoſing thoſe Premiums, is judged proper to be here inſerted.*

Royal

Royal Park Academy, Greenwich, March 21, 1787.

DEAR SIR;

MY Pupils have frequently entreated that I would convey their grateful thanks to your honourable Society for the teſtimony borne to their improvement and progreſs in learning the Latin language; I thought I ought not to reſiſt ſo becoming a requeſt. Their examination before the Committee of Polite Arts, had already done credit to their heads; and the ſenſe they entertain of the liberal and generous proceedings of the Society, is a proof that their hearts are ſuſceptible of the moſt amiable feelings. Let me then beg of you, Sir, to gratify their earneſt deſires, by requeſting the Society to accept their thanks, for the marks of approbation they have received; and aſſurances that theſe marks ſhall operate

with them, as additional incitements to perſevere in the purſuits of literature.

To the thanks of my boys, ſuffer me to add my own acknowledgment for the opportunity the Committee afforded the young Gentlemen in the length and ſtrictneſs of their examination, of doing credit to themſelves, by the proofs that ſuch an examination produced, of the rapid advancement they had made in their ſtudies, at ſo early an age. The laudable zeal which prompted the Society, to propoſe Medals for the improvement of education, has eſtabliſhed this truth — That youth may be completed, in a claſſical education, in one half of the time uſually devoted to it. And that by conſequence they may have greater leiſure to improve themſelves in other branches of knowledge, to the benefit of themſelves and advantage of the Publick. Fully perſuaded

ſuaded of this truth, I entered into the deſigns of the Society, and the young gentlemen I had the honour of preſenting to the Committee, have proved that I was not too ſanguine; for it appeared to all the members preſent, when my boys were examined, that excluſive of the fluency with which they converſed in Latin, they had acquired an amazingly extenſive acquaintance with Greek and Latin authors; and this acquaintance would have appeared more ſurpriſing, had they been examined as to their knowledge of Engliſh and French: But theſe living languages were not within the plan or deſign of the Society. All this they have performed with eaſe to themſelves; for it is my object, to diveſt inſtruction of all harſhneſs which ſtrikes terror into young minds, and retards, rather than promotes the progreſs of pupils. I endeavour to make ſtudy rather an amuſe-

ment than a toil; to render the hours of recreation ſubſervient to my views of forwarding the claſſical part of their education, by inducing them to a habit of ſpeaking Latin readily and accurately: For this end, boys of a certain ſtanding are prohibited the ſpeaking any language but Latin or French, and a Signum or Mark, is circulated for the purpoſe of checking barbariſms and ſoleciſms. When the boy who has this Mark, hears a ſchool-fellow utter a word ungrammatically, he paſſes the Mark to him, which is called for three times every day; and he who has had it moſt frequently, in the interval of thoſe periods, is fined in a ſmall ſum. To avoid this penalty, they pay great attention to the choice and arrangement of their words, the conſtruction of their phraſes, and the ſtile, purity, and elegance of their diction. When they find themſelves at a loſs for proper expreſſions, they

they conſult a dictionary, or apply to a maſter for aſſiſtance; and thus by degrees they acquire a proper mode of ſpeaking; to which the daily verſions they make from Latin into Engliſh, and from Engliſh into Latin, together with the obſervations they are taught to make on the ſtile of the beſt authors, do not a little contribute. To the Society I need not point out the happy effects of ſuch a method diligently followed—With their penetration, they muſt quickly perceive that a conſiderable ſaving of time and expenſe, muſt be enumerated amongſt its many good conſequences, and that the more generally it is adopted through the nation, the greater will be the benefits reſulting from it to ſociety.

Should I be the humble inſtrument, in the hands of providence, and under the auſpices of the Society, of demon-

ſtrating the practicability of ſuch an improvement, and cauſing it to be generally adopted; the happineſs which it would ſecure to the young learner, the ſatisfaction to his parents, and the advantage to the community at large, would be to me, the moſt deſired, the moſt grateful reward of my labour. At all events, I will unremittingly, while God allows me ſtrength, purſue that plan, which has been approved by the ſuffrages, and honoured by the applauſe of the Society; and I will exert my abilities, to encourage others by my precept as well as example, to make choice of a ſyſtem which promiſes conſiderable benefits to the publick.

Having taken the liberty of requeſting that you would lay before the Society my own acknowledgement and that of my boys; ſuffer me now, Sir, to expreſs my

ſincere

ſincere thanks to you, for the polite terms in which you intimated to me the reſolution of the Society, confirming the vote of their Committee, in approbation of my endeavours, for the improvement of the ſyſtem now in uſe. I have alſo to thank you, Sir, for the juſtice done my boys, both by the very diſtinct and emphatical manner in which you read their tranſlations to the Committee, and the preciſion with which you took down their anſwers to the various queſtions propoſed to them by the Committee.

I am,

with profound reſpect

and great perſonal regard,

Dear Sir,

your moſt obedient

and moſt obliged ſervant,

Mr MORE,

JAMES EGAN.

IN

IN the fourth Volume of theſe Tranſactions, page 129, a ſhort hiſtory is given of Mr. Grenville's contrivance for teaching blind perſons arithmetic, to which is added a full deſcription and print of the Machine; and this Year 1786, the Society received from Mr. Griffith James Cheeſe, a Machine for teaching blind perſons Muſic, which on examination by ſome celebrated profeſſors, was declared to be more ſimple than thoſe hitherto made uſe of for that intent, has more characters, and therefore more copious; and the cuſhion is ſo ſmall as to be portable; whereas the inſtruments in common uſe for the purpoſe, are ſo large as to prevent their being commodiouſly carried from one place to another, and as by combining ſeveral

of

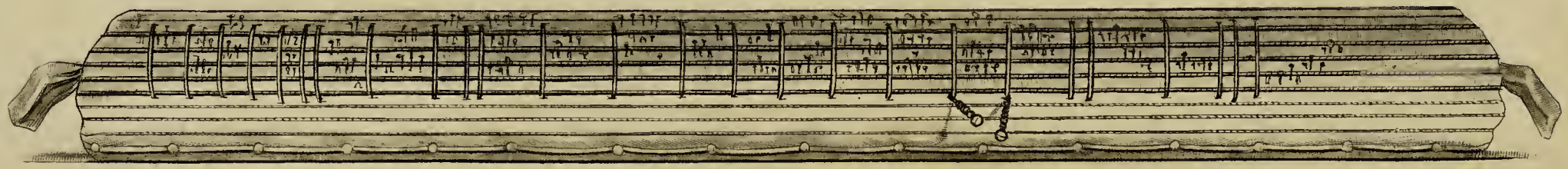
of theſe Machines, the greateſt works in Muſic may be compleatly written.

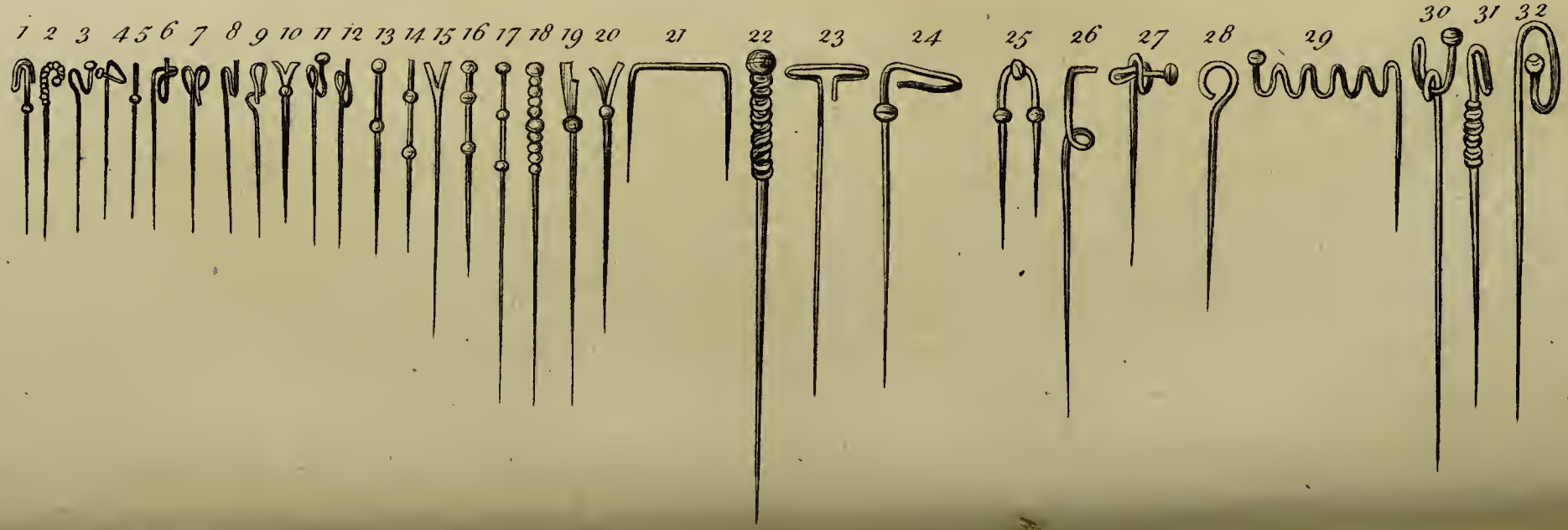
It may not be unſatisfactory to the reader to be informed of Mr. Grenville's opinion of the contrivance, who being preſent at the Committee, declared he could not draw out an organ part from the ſcore of a full chorus, unleſs all the parts were written on ſuch a Machine, and it would be the higheſt delight to every blind muſical perſon to have one of Handel's choruſſes, written in ſcore, on one of theſe Machines, as it would quite aſtoniſh him to know how the parts are diſpoſed; without which he can have no idea of the contrivance of the parts, and conſequently is deprived of the greateſt pleaſure muſic can afford him.

In

In conſequence of theſe informations, the Society voted their Gold Medal to Mr. Cheeſe, on condition that he left a compleat Machine, and a proper deſcription with them, for the inſpection of the public. The Machine is now reſerved in the Repoſitory of the Society, and the following is the deſcription of it, as given by the inventor.

Mr. Cheese's Machine for teaching Blind Persons Musick.





A Deſcription of Mr. CHEESE's *MACHINE for TEACHING MUSIC to People deprived of Sight, and to enable them to preſerve their Compoſitions, in the act of Compoſing, without the aſſiſtance of a copyiſt.*

THAT part of the Machine which repreſents the book, or paper, is a ſmall cuſhion ſtuffed, on a little frame; along which, is ſewed a number of pack-thread ſtrings at equal diſtances from each other; theſe repreſent the lines in a muſic book; the five which compoſe the ſtave, are made of large twine, and thoſe which repreſent the ledger or occaſional lines, drawn through the heads of the notes, where the muſic exceeds the compaſs of the eſtabliſhed ſtave, are made of ſmall twine, and are

on

on this Machine of the ſame length as the others.

If the practitioner only wiſhes to write Harpſichord Muſic, his cuſhion may be what length he pleaſes, and about five or ſix inches wide; the ſtrings muſt be ſewed in the following order; beginning with the firſt or loweſt, near the edge of the cuſhion; four ſmall ones, which correſpond with the notes in the baſe of the inſtrument ff, rr, cc, ee: Next five large ones, for the ſtave which correſpond with the lines in the book, or notes in the inſtrument, g, b, d, f, r, one ſmall one, which repreſents the occaſional line between the baſe and treble, or middle c; five large ones for the treble ſtave, which make the notes e, g, b, d, f; three ſmall ones, which repreſents the ledger lines when the muſic goes in alt. Theſe provide for the note a, in alt, c, in alt, and e,

in

in alt, in the ſpace above which, next the edge of the cuſhion, the f, in alt is wrote, when it is wanting, which compleats the compaſs of the inſtrument.

Thoſe who only ſing or play on ſingle inſtruments, ſuch as Violins, &c. ſhould have their cuſhions not above half the width of thoſe before-mentioned, upon which there ſhould be but one ſtave, and that in the following order:

Two ſmall lines at bottom, five large ones in the middle, and three ſmall ones at top, neither of the outſide lines of theſe ſmall cuſhions ſhould be ſewed cloſe to the edge, as there are notes ſuppoſed above and below; at either end of theſe ſmall cuſhions, there ſhould be a ſmall wire ſtaple, in order that any number of them may be combined together at pleaſure, by running a rod through the ſtaples;

ſtaples; this will enable the practitioner to write what muſicians call, SCORE, in any number of parts he pleaſes, and by this means, a thorough knowledge of the great works of Handel, and all other claſſical authors, may be acquired as well without ſight, as with it.

The characters uſed to write on this Machine, are pins, ſome with two, three, or more heads, others bent in different forms — ſome, the heads taken off and the top beat flat, ſome of theſe are ſplit, others the heads taken off, and placed near the middle. The bars are pieces of wire crooked at each end, a double bar is made by placing two ſingle ones cloſe together, a double ſharp and double flat in the ſame manner.

The characters are kept in a box, in the ſame ſtile as the printer keeps his types;

types; each different compartment of which, muſt be marked with a character in writing, ſignifying what each, contained in the ſeveral compartments, is intended to repreſent. That the maſter may be acquainted with them, the ſtudent muſt be taught to diſtinguiſh each of the characters contained in the box by the feel, as well as the names of each line and ſpace upon the cuſhion; when he can do this readily, ſome muſic ſhould be read to him, which it will be well for him to copy on the cuſhion, and when that is filled, let it be laid on the deſk of the Harpſichord before him, and then by feeling over a paſſage, or ſentence at a time, and afterwards playing it, his playing always commencing with the beginning of the piece, or at ſome particular part of it; this will ſoon enable him to recollect the whole, when the hands are taken off the cuſhion, to play

what has been laſt felt; one of thoſe characters, called a direct, muſt be placed againſt the note to be next felt: This will enable the ſtudent to go on again, after playing, without any difficulty. The perſon who reads the Muſic, muſt be inſtructed not to call the lines or ſpaces by the letters which diſtinguiſh them, leſt confuſion may enſue, every eighth being the ſame, but muſt read in the following manner, firſt the name of the character muſt be mentioned, whether, Minim, Crotchet, or Quaver, &c. then the line or ſpace, as for example; Minim, on the firſt line, Crotchet on the firſt ſpace, Quaver, on the ſecond, &c. &c.

When the Muſic exceeds the compaſs of the ſtave, it muſt be particularly mentioned whether above or below, firſt calling the character, then the ledger line or ſpace.

It is my duty to recommend it to ſuch maſters as may have the care of Pupils that require the uſe of this Machine, very early to make them acquainted with the principles of harmony, and the other grammatical rules of the ſcience, as this is the only real aſſiſtance which can be given to the memory, and has the farther good tendency of ſoon enabling the practitioner to play extempore, which ſtile of playing is of far more utility to perſons deprived of ſight, than to thoſe who enjoy it.

The technical term at the beginning of each piece, is better remembered than wrote down on the Machine: The accidental terms, which are beſt marked by placing ſome character, not much uſed, either above or below the note on which it happens, the ingenious mind will find out a method of doing for itſelf.

This Machine will not only teach Muſic, but calling the characters letters, any one will be enabled to ſpell, read, or write down his ſentiments on any ſubject, and even convey them to his friend without the aſſiſtance of a ſecretary. Arithmetic may be alſo taught upon this Machine, as by calling the dot 1, and the Pauſe 10, a compleat ſet of figures will be formed.

Mr. Cheeſe will ſhortly do himſelf the honour of laying before the Society another invention which is to enable perſons deprived of ſight, to teach Muſic to thoſe who enjoy it,—this he hopes will be ſufficient to render the blind maſter, tolerably compleat.

Deſcription

Deſcription of the Plate of the Cuſhion, contrived by Mr. Griffith James Cheeſe, *for teaching blind perſons Muſic; with the forms of the ſeveral Pins uſed by him, to prick down the various notes, &c.*

A, B, C, D, the form of the Cuſhion, which in its full Size, is about three feet long, and five inches and three quarters wide, having thereon a repreſentation of muſical notes, ſhewn by different Pins ſtuck on it. The lines a, b, c, d, e, are of large Packthread, and the Lines f, g, h, are of ſmall Twine.

Pins

No. 1 A Semibreve.
2 A Semibreve reſt.
3 A Minim.
4 A Minim reſt.
5 Dots.
6 A Crotchet.
7 A Crotchet reſt.

Pins.

8 A Quaver.
9 A Quaver reſt.
10 A Sharp.
11 A Semiquaver.
12 A Semiquaver reſt.
13 A Demiquaver.
14 A Demiquaver reſt.
15 A Flat
16 A Demeſemiquaver.
17 A Demiſemiquaver reſt.
18 A Semidemiquaver.
19 A Semidemiquaver reſt.
20 A Natural.
21 Bars.
22 A Direct.
23 A Tye
24 Baſe.
25 Tenor cliff.
26 Treble cliff.
27 A Repeat.
28 Pauſe.

29. This character placed on any line or ſpace, ſignifies as many notes on that line or ſpace, as there are doubles on the Pins, if turned upwards it implies the ſame number aſcending, if downward, that number deſcending.

30. A Beat or inverted Shake.

31. A Shake, and where there is a Dot placed over it, ſignifies a turned Shake. Two Dots placed over each other, above the notes, without this character, ſignifies a Turn only.

32. This character is uſed over the note to ſignify *forte*, and if a Dot is placed above it *fortiſſimo*, if the Dot is placed above the note and below the character, it implies *creſcendo*, if the character is placed below the note it ſignifies *piano*, and if a Dot is placed under it, *pianiſſimo*;

but if the Dot is above the character, and below the note, it ſignifies *diminuendo*. In Concertos, I uſe the ſame character placed above the note in the ſame manner, with two Dots over it to ſignify *toote*; and below the notes, with two Dots under it ſignifies *ſolo*; in vocal muſic, the ſame character above the notes, with three Dots over it, ſignifies *ſymphony*; and below the notes, with three Dots under it, ſignifies *ſong*.

PAPERS

IN

MANUFACTURES.

MANUFACTURES.

THE univerſal ſatisfaction which the Letters of Miſs Rhodes, publiſhed in the fourth Volume of theſe Tranſactions, on the breeding and management of Silk Worms in England, have given; plainly ſhews how much the publick wiſh to ſee that deſirable end accompliſhed; and as the Society have been favoured with ſome further obſervations, on this head, by the ſame ingenious and attentive lady, as well as by the Rev. Mr. Swaine, of Pucklechurch, near Briſtol, whoſe judicious remarks on this ſubject, are contained in the following Letters, there is every reaſon

reaſon to hope, the Time is not far diſtant, when, by plantations of Mulberry-trees, being made, and the management of the Worms carefully attended to, our manufacturers may be, in a great meaſure, ſupplied with Silk the produce of this country, and employment furniſhed to many poor in the younger part of their lives; by which habits of induſtry will ſpread among them; to the general advantage of the kingdom; and the common complaint of the want of proper employment for young women, and children, be in a great meaſure obviated.

The thanks of the Society were given to Miſs Rhodes, and to the Reverend Mr. Swaine, for theſe Communications.

SIR,

SIR,

EQUALLY influenced by your requeſt, and the recollection of my own promiſe, I again renew the taſk on which the Society has beſtowed ſuch an high degree of attention, and approbation: And although in the proſecution of my ſcheme, I have experienced diſappointments which effectually exclude me from the prize my ambition led to, I cannot think myſelf totally unfortunate, ſince thoſe very diſappointments may ſupply the moſt uſeful hints to others, and, however paradoxical it may appear, are ſo many new proofs of the practicability of my plan.

I congratulate myſelf on your having ſeen my manufactory laſt ſummer, as you can witneſs the number of Silk Worms

I fed. I had calculated that thirty thouſand would produce me about five pounds of Silk, and at the time you ſaw them, I had many more than that number. They were extremely healthy, and ſupplied plentifully with food by the generous exertions of my friends, who, with unexampled kindneſs, ſent me freſh leaves daily, although ſome of them reſided at the diſtance of fifteen, and twenty miles from me.

About the beginning of July, the Worms had attained their full growth, and arrived at that ſtate of beautiful tranſparency which predicts their diſpoſition to ſpin: But at this criſis, a chilling north eaſt wind ſet in, and we felt a degree of cold little ſhort of ſome of the ſevere winter months. Such an uncommon ſeaſon had never been remembered here, and its baneful effects were viſibly

viſibly diſplayed on my little family. All thoſe that were ready to ſpin became of ſuch an icy coldneſs, that it was ſcarcely poſſible to bear them on the hand: They made ſome feeble efforts to eject the thread from their mouths, but in vain, for they ſhrunk into their chryſalis ſtate, without being able to form even the Web, which incloſes the Cone. This was equally new, and alarming to me, and I watched them with the moſt anxious attention. The principle of life was viſible in them as in the chryſalis's which had ſpun. That this change was the effect of cold, I had no doubt; but I wiſhed to diſcover how that effect was produced, and this I could only do by opening ſome of them. On examination, I found that the glutinous matter which forms the Silk, was become ſo highly congealed by the cold, that it reſembled a ſtrong tendon, both in appearance, and tenacity; whereas I had

ever

ever found it to be perfectly fluid in thoſe Worms which were employed in ſpinning.

My diſtreſs encreaſed hourly, for thouſands went off thus every day. It was ſufficiently obvious that the making of fires would remedy the evil; but they were unfortunately ſituated over a range of warehouſes, which rendered that, not only dangerous, but impoſſible. To remove ſuch numbers into the houſe, was equally impracticable; but alas! they were ſoon ſufficiently reduced for me to adopt that plan, and in one of the coldeſt days I almoſt ever felt, with the aſſiſtance of ſeveral of my friends, I removed them to their former apartment. Here I kept large and conſtant fires, and the Worms as they arrived at maturity, purſued their induſtrious occupations with alacrity.

From

From this you will perceive Sir, that cold, though it impedes their growth, does not eſſentially injure the Worms, until they arrive at the ſtate for ſpinning; and that then, a certain degree of heat is requiſite to render the Silk ſufficiently fluid, for them to eject it with eaſe. If I could have made fires at firſt, I am perſuaded that the dreadful havoc would have been prevented; and thoſe who rear them for profit, may readily conſtruct places, where an artificial heat may counteract the effects of an uncommon ſeaſon, and prevent ſuch a calamity.

Although the whole ſummer was with us, unuſually cold, I loſt none until the time I have mentioned: but thoſe which I preſerved, by a removal into the houſe, were comparatively few indeed! not more than five or ſix thouſand.

I well know that the generality of the world, form their opinions of the expediency of ſuch an attempt as this, by its eventual ſucceſs: But ſurely my failure may be compared to that of the poor farmer, who beholds with delight, a plenteous crop bending for the ſickle, which by a ſad reverſe, a ſucceſſion of deſcending torrents deſtroys; and who nevertheleſs renews his toil of culture, with better hopes from the ſucceeding year. True it is that in one inſtance we differ materially, for he has no ſecurity againſt another bad ſeaſon, whilſt an artificial arrangement can to me, diſtribute a ſufficient degree of warmth. The effort I made this year, if ſucceſsful, would have been final: I muſt now perſevere two or three years longer, for I have reſolved not to relinquiſh my deſign until I have obtained the quantity of Silk neceſſary for a dreſs. *This* was originally my

my ſole motive, but I have the pleaſure of thinking, that I have abundantly eſtabliſhed the following facts.

Firſt, That the management of the Silk Worm, is by no means difficult, the principle objection having been obviated, by the diſcovery, that they may be ſupported ſo long a time, on an indigenous plant, which may be procured in all ſituations.

Second, That our climate ſupplies a ſufficient degree of warmth to bring the Silk to the higheſt perfection, unleſs in very extraordinary ſeaſons, which may be guarded againſt by the conſtruction of fire-places.

Third, And that the profits which ariſe from the manufacturing of Silk, are immenſely advantageous, one fourth

part of the price of the Silk being adjudged enough to defray the whole expenſes. I know of few circumſtances which would gratify me ſo much, as the having been the means of promoting the eſtabliſhment of a Silk Manufactory on a large ſcale.

There was a Patent granted by George the firſt, for the encouragement of one; and two thouſand Mulberry-trees, were actually planted at Chelſea for that purpoſe: how it miſcarried I have not learnt; but many of the trees, muſt certainly remain, therefore that would be the ſpot beſt calculated for the trial. For this circumſtance, I am indebted to a very ingenious Eſſay on the Silk Worm, publiſhed by Henry Barham, Eſq. in the year 1719, which abounds with the moſt uſeful information I have yet met with on the ſubject; and in which, my opinion of the

the prodigious profits, and certain ſucceſs, that would attend the eſtabliſhment of the Silk Manufactory in England, is moſt amply and inconteſtibly ſupported.

I am, Sir,

Your moſt obedient humble ſervant,

HENRIETTA RHODES.

Cann Hall, Bridgnorth,
Dec. 28, 1786.

Mr MORE.

SIR,

I Have juſt now peruſed the fourth Volume of the Tranſactions of your patriotic Society, and it is with inexpreſſible ſatisfaction, I obſerve the rapid progreſs towards perfection which the Arts and Manufactures of this country are daily making under their auſpicious patronage. What I am particularly pleaſed with in the Volume I have juſt read, is, the attention ſtill continued to, and the encreaſing proofs of the practicability of the raiſing of Silk in this Iſland. The elegant letters of Miſs Henrietta Rhodes, inſerted therein, have induced me to ſend you the following remarks, together with the ſpecimen of Silk, incloſed in the ſame cover; theſe however, are by no means intended as candidates for a diſtinction ſimilar to that wherewith the letters

letters of that ingenious young lady have been moſt deſervedly honoured by the Society, (as I am conſcious they have no pretenſions of this kind) or in the light of rivalſhip; but merely to corroborate the teſtimony there adduced, that the production of merchantable Silk from Worms fed in this Iſland, is not only practicable, but that there would be almoſt a certainty of a manufactory of that kind ſucceeding, were there a ſufficiency of proper food eaſily procurable for the Worms which produce it. That food I am confident will never be found in the leaves of any other tree, or plant, than thoſe of the Mulberry. For although Silk Worms will feed on the leaves of Lettuces, and will ſometimes ſpin their web, and go through their ſeveral metamorphoſis without any other food, when they have been accuſtomed to that from their firſt excluſion from the eggs; yet

they will never thrive ſo well, become ſo large, or ſpin a web either ſo good in quality, or ſo abundant in quality, as when they have been fed during their whole exiſtence in the larva ſtate, on their natural food Mulberry-leaves. And ſuppoſing the leaves of lettuces to be an equally proper food for them, yet the great extent of land neceſſary for the growth of lettuces ſufficient for the conſumption of any conſiderable number of Worms, muſt ſurely render ineffectual every attempt to raiſe Silk upon that plan.

In the Society's ſecond Volume we have an account of a very ample reward beſtowed on a Mrs. Williams, of Graveſend, for her communications on the ſubject of Silk Worms, chiefly tending to ſhew that a ſubſtitute for Mulberry-leaves had been diſcovered. I have tried moſt

of

of thoſe plants recommended by her, and ſeveral others, without the ſmalleſt appearance of ſucceſs. The Worms would ſometimes eat them, but whenever they did, it always proved prejudicial to them, and generally deſtructive.

In the valuable Paper ſubjoined to Mrs. Williams's Letters, written by the honourable Daines Barrington, it is hinted that a ſuccedaneum for Mulberry-leaves might be diſcovered by examining what inſects, in this country, feed upon the Mulberry, in common with other plants; preſuming from thence, if any ſhould be found, that thoſe plants would reſemble each other in their flavour and nutritive qualities. Could any inſects be found in the circumſtances before mentioned, it might poſſibly lead to ſuch a diſcovery. But your correſpondent Miſs Rhodes, has remarked (and I have myſelf

ſelf noticed the ſame) that no indigenous inſect of this country preys on the leaves of the Mulberry; not even the race of *Aphides*, thoſe almoſt univerſal plunderers.

As a farther direction to a reſearch of this kind, the obſervation of Botaniſts may be adduced, that plants of the ſame natural claſs and order have a near reſemblance in their virtues and qualities. This clue would lead us to only a few plants of the native growth of this Iſland, which ſtand in the above degrees of affinity to the Mulberry: And theſe are, the Nettle, the Box-tree, the Birch-tree, and the Alder. The moſt likely of theſe I ſhould ſuſpect would be the Birch: for I have not tried either of them, neither do I recommend the experiment to others; as I think all experiments with a view to procure a ſubſtitute for the Mulberry quite unneceſſary. For what neceſſity

ceſſity can there be for ranging in queſt of other food, when the Mulberry-tree itſelf, the acknowledged proper and natural food of theſe inſects, will thrive and proſper in this country as well as moſt other trees. In very poor ſoils indeed they grow ſparingly. But in ſoils tolerably rich, either thoſe that are naturally ſo, or enriched by art, they vegetate with all the luxuriance that can be wiſhed. I at preſent know the owner of two Mulberry-trees, which have not been planted more than fifteen or ſixteen years from the layers, which, in my opinion, would each of them have maintained for theſe two or three years paſt, near three thouſand Worms in a ſeaſon.

The chief reaſon alledged for the neceſſity of finding out a ſubſtitute for Mulberry leaves, is, that theſe leaves are not produced early enough in this climate

to

to become the food of the infant Worms. It is well known, that the leaves of the Mulberry-tree, ſeldom begin to unfold themſelves before the latter end of May, or the beginning of June. It is likewiſe a matter of notoriety, that thoſe few Silk Worms, which have as yet been bred in this Iſland, have moſtly been hatched by the beginning of May, or even earlier. From hence there has been ſuppoſed a neceſſity for providing ſome more early vegetating plant for their food, before the leaves of that tree are ready for them. That no ſuch neceſſity exiſts, is to me very apparent. Is it not natural to conclude, that the conſtitution of the air, reſpecting warmth, ſhould at one and the ſame time expand the leaf, and protrude the inſect which was intended by all-wiſe providence to inhabit and feed on that leaf? This, we may obſerve is the conſtant courſe of nature, with reſpect to all other

inſects

inſects and their food. We have every reaſon to ſuppoſe that this is the caſe with the Silk Worms, and the Mulberry-leaves, in thoſe countries where both are indigenous: And I have not the ſhadow of a doubt that this effect would naturally and invariably obtain as well in this climate as any other, did not human imprudence interpoſe to prevent it, and art obſtruct the intention of nature. The eggs of Silk Worms, have in this country, been generally conſigned to the care of young people, and chiefly thoſe of the female ſex. They have been preſerved in Bureaus, and cheſts of drawers, in rooms where fires have been conſtantly kept during the winter ſeaſon. In the ſpring, as ſoon as the influence of the ſun began to be powerful, the eagerneſs of youthful curioſity, has cauſed them to be removed to windows, where the ſun exerted its full power; and in this ſituation

they

they have been generally forced into exiſtence, within a few hours, in a ſeaſon, when the temperature of the air was unfit for them, and when their proper food could not be procured.

One of your late correſpondents on this ſubject, Mrs. Williams, has proved that the hatching of the eggs may be accelerated, and has averred, that it is even poſſible to hatch them in the midſt of winter: The other, Miſs Rhodes, has experienced that it may be retarded beyond the uſual time, ſince in her ſecond letter, dated the 24th of Auguſt, 1785, ſhe informs you, that her Silk Worms eggs, in that year, were not hatched until the ſecond of June, and not even then, without being placed in the ſunſhine. I have this ſeaſon retarded it longer, until the middle of June; when likewiſe it was effected, by expoſing the eggs to the vivifying

vifying influence of that great ſource of life and light. There cannot then, I think, be the leaſt doubt that the eggs of Silk Worms may be hatched at almoſt any time. And I ſhould recommend it to every perſon who ſhall hereafter engage in the buſineſs of breeding theſe Worms, unleſs it be for mere amuſement, to take care that this effect does not take place until the Mulberry-tree is nearly in full leaf.

There are three reaſons which appear to me of great weight for recommending the full foliation of the Mulberry-tree, as the regulator in this matter. The firſt is, that there may be a ſufficient ſtore of their natural food ready for the young Worms, as ſoon as they come forth from the eggs, which will preclude all neceſſity for ſeeking after other food. A ſecond is, that theſe Worms being originally natives

of

of a warm climate, may be ſure to be brought to life when the air is of a temperature congenial, and agreeable to them; ſince it is a general obſervation among gardeners, that when the Mulberry-tree begins to expand its foliage, it is a certain ſign of the near approach of fine, warm, ſettled weather. A third reaſon is, that the Mulberry-trees may be permitted to put forth a good quantity of leaves before any of them are plucked, that ſo they may not ſuffer ſo much in health from that operation, as they otherwiſe would do, and may be equal to the ſupport of a much larger ſtock of inſects. For it is certain, that the leaves are as neceſſary to the life of a vegetable, as the ſkin or the lungs are to that of an animal. If therefore moſt of the young leaves are immediately cropped off, as ſoon as they are put forth, the conſequence undoubtedly will be, that the tree will be ſo weak-

ened

ened and retarded in putting forth its leaves, that it will not produce near the quantity it would otherwiſe have done, and if this uſage be often repeated, will inevitably be deſtroyed. To this laſt mentioned circumſtance I impute it, that the tender heart of your fair Shropſhire correſpondent ſuffered thoſe mortifying apprehenſions which ſhe has ſo feelingly deſcribed in her firſt letter, page 150, of your late publication; and that ſo conſiderable a number as twelve large Mulberry-trees were ſcarcely adequate to the maintenance of ten thouſand Worms.

If what I have aſſerted in the beginning of this letter be a fact, that no other vegetable can ever be ſubſtituted, with advantage, as the food of Silk Worms; it will follow, that before any attempt to breed them upon an extenſive plan can ſucceed, it is abſolutely neceſſary that the

Mulberry-trees ſhould become much more numerous than they are at preſent. Of this the Society, it ſhould ſeem, have long been convinced; ſince they have, through a ſucceſſion of years, proffered rewards for increaſing their number; but hitherto, I believe without ſucceſs.

From the premiums No. 40, and 41, in the claſs of Agriculture, as they now ſtand in the laſt Volume, I was led to apprehend, that the Society had given up the matter in deſpair; and that thoſe premiums were intended to be diſcontinued. I hope my apprehenſions will prove groundleſs; and to have been occaſioned merely by typographical error.

If it would not ſubject me to the imputation of impertinence or preſumption, I would recommend it to them to multiply their premiums on this head, and to be particularly liberal in their offers.

There

There are three modes of raiſing Mulberry-trees, to which we are directed by Nurſery-men. The raiſing them from layers, from ſeed, and from cuttings. The chief method now in practice for thoſe few trees there is a demand for, is by layers. But this is ſuppoſed to be an inſufficient mode, where great numbers are wanting. And yet Elm-trees, which are planted in ſuch numbers in this country, are chiefly propagated by this method. The mode of raiſing them from ſeed, is not only tedious but uncertain; as the ſeed ſeldom ripens ſufficiently in this climate, and the dependance on foreign ſeeds of any kind is extremely precarious. The late premiums of the Society have reſpected only the laſt method, namely, that of raiſing them from cuttings: This would be doubtleſs, the moſt adviſeable method for raiſing a large number of trees in a ſhort time; provided the cuttings of the Mul-

berry-tree could be made to take root as readily as the cuttings of Willow, Poplar, and ſome other trees. This however is not the caſe, for with the greateſt care many of theſe cuttings will not grow, unleſs aſſiſted by artificial heat.

I have taken notice, that whenever the branches of a Fig-tree have been ſome time incloſed in the ſhreds, by which they are uſually tacked to the wall after pruning, abundance of budding roots are generally put forth. From hence I ſurmiſed, that cuttings of any trees might probably be prepared for taking root more certainly and expeditiouſly, by tying a ſhred of old woolen cloth or ſuch like ſubſtance, pretty tight round every ſhoot that is intended for a cutting, as ſoon in the ſummer as it has made any conſiderable progreſs, at the place where it iſſued from the laſt year's bud, I tried this experiment

periment laſt ſeaſon, on ſome cuttings of the Arbor Vitæ, and the Althæa, the cuttings of which ſhrubs, are known to take root in the common method with great difficulty. And though theſe did not ſucceed agreeably to my ſanguine expectations, yet I am very unwilling to think this experiment deciſive. May not ſome ſubſtance be diſcovered which would more powerfully ſolicit the incipient roots, than that which I have tried? What would attract the moiſture of the air, and at the ſame time be void of cauſticity, or other corroding or injurious quality, I ſhould imagine would be moſt likely to have this effect, if any ſuch could be found.

Perhaps the following proffer (provided the Society's fund was equal to it; which from the very numerous and reſpectable liſt of members I have no doubt of) might have very beneficial conſequences in re-

ſpect to this object, the ſpeedy increaſe of Mulberry-trees. To any perſon who in the year —— ſhall plant, or cauſe to be planted in any one pariſh, townſhip, or place, any number of Mulberry-trees, not leſs than fifty, of the height of three feet or upwards, in places well ſecured, and not within the diſtance of eighteen feet from each other, the ſum of five guineas; to the perſon who ſhall ſo plant, or cauſe to be planted the greateſt number, the Gold Medal in addition; to the ſecond greateſt number, the Silver Medal in addition. Claims with certificates to be ſent in immediately after planting; and other certificates to be ſent, that the plants are in a growing condition two years afterwards, when the claimants ſhould be entitled to the rewards. And any perſon to have the liberty of claiming the pecuniary part of the above premium *toties*, until

until the Society ſhould think fit to diſcontinue it*.

This, I ſhould think, would ſtimulate Gardeners and Nurſery-men, to raiſe great quantities of theſe trees to plant them out for people in gardens, orchards, &c. at a low price; or even, if they could not get purchaſers, to plant them gratis. The obtaining of Mulberry-trees, I look upon as the firſt and grand object. In the ſcarcity of theſe, lies the great ſtumbling-block, and whenever this ſhall be effectually removed, I am confident that the raiſing of Silk in this country, will be no difficult taſk.

The ſpecimen of Silk, herewith ſent, contains ſix ſmall ſkeins, each of them the whole length of the web (except the waſte Silk firſt taken off, and a very little

* In the premiums offered this year, it will be ſeen what attention has been paid by the Society, to the hints given above.

left ſurrounding the Aurelias) of a dozen Worms reeled off together. The bit of paper rolled round a part of each ſkein, was ſet as a mark to find the extremities, and to prevent all entanglement. They are ſent in this detached manner, that the Society may, if they pleaſe, ſatisfy themſelves as to the length, by cauſing an actual meaſurement of each ſkein or thread to be taken. Whether either of them will equal the length of the ſpinning, meaſured by Miſs Rhodes; I much doubt. The coccoons were reeled off in hot water, wherein a little Gum Senegal, had been diſſolved. I have reaſon to think, that the young lady juſt mentioned, has been miſinformed reſpecting the gum being the criterion whereby to judge of the goodneſs of Silk; ſince I have been aſſured by a very intelligent Silk-throwſter, that the gum, ſo apparent in the bales of Silk imported from abroad, is not the natural production of the Silk-worm, but chiefly

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the addition of art: and that the Silk when received, is oftentimes ſo highly ſtiffened, that the workmen are obliged to diſcharge much of the gum, by diluting it in water, before they can reel the Silk off from the ſkein, or manufacture it in any way whatever. I have tried the experiment of reeling off the coccoons in boiling water; it has a good effect in diſſolving the natural gluten, which cauſes the web to part more freely; but I was never ſo fortunate as to find the lives of the inſects preſerved after paſſing through this ſevere ordeal. The moſt troubleſome office in the buſineſs of breeding Silk Worms, is the cleaning them. This in the common mode, is a tedious and diſagreeable taſk, as well as incommodious, if not injurious, to the Worms. Miſs Rhodes did not think this operation neceſſary oftener than once a week. It has appeared to me to be abſolutely neceſſary

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to the health of the insects, when they are full grown, or nearly so, that it should be performed at least once a day. I have the idea of a simple apparatus, whereby I imagine this obstacle will be totally removed, as well as some other inconveniences, which I mean to get realized before the next breeding season. Should it please me so well when reduced to practice, as it does at present in theory, I shall take the liberty to send you either a Model or Description of it.

I am, Sir,

Your most obedient humble servant,

G. SWAYNE.

Pucklechurch, near Bristol.
Oct. 15, 1786.

Mr MORE.

IN

IN the fourth Volume of the Society's Tranſactions, mention has been made of the Seeds of a very large kind of Hemp, having been ſent to the Society, from the Honourable Eaſt India Company, and ſome accounts given of the culture of the Plant; See Vol. 4. Page 32, &c.

Although theſe Seeds were diſtributed to many perſons, and the plants grew well, yet it does not appear that much attention has been paid to the preparing the Fibres, into a ſtate fit for the purpoſe of Manufactures, one ſample only, having been received, and that from John Wilkinſon, Eſq. of Broſeley; it is the opinion of that gentleman, that, notwithſtanding the great ſize to which this ſpecies of Hemp grows, yet, from the difficulty

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of ſeparating the fibrous parts, the great length of time required for ſteeping, and the uncertainty of the ſeed, when brought from ſuch a diſtance as China, growing in this climate, it will hardly ever become a matter of great national importance.

The laſt reaſon ſeems to have conſiderable weight, for the Hemp Seed, ſaid in Vol. 4. Page 242, to be preſented to the Society, by the directors of the Eaſt India Company, has been found, on repeated trials, not to be in a ſtate proper for vegetating.

Another Material, under the name of Hemp in the rough ſtate from China, has alſo been received from the Eaſt India Company; of this, trials have been made, by an experienced workman, and it appeared, by ſamples produced,

duced, that the Hemp dreſſed, the thread, the cloth and the Ropes manufactured from it, are excellent of their kinds, and if this Hemp can be imported at a price for the market, it ſeems likely to anſwer many valuable purpoſes.

Theſe Samples, which are now reſerved in the Society's Repoſitory, were ſent to the Court of Directors of the Eaſt India Company, for their inſpection; and in anſwer to the requeſt of the Society, "That the court would inform them, if they thought it not improper, at what price this kind of Hemp could be imported into England?" the following letter was received.

SIR,

SIR,

YOUR letter of the 23d of November laſt, having been laid before the Committee of Warehouſes of the Eaſt India Company, I am directed to requeſt you will be pleaſed to expreſs to the Society, the Committee's thanks for the information contained therein reſpecting the Hemp from China.

Agreeable to your requeſt, I return you the ſamples manufactured therewith, and have further to communicate, that the Company not being in poſſeſſion of the price of the ſaid Hemp in China, they have given directions to their Supra Cargos there, to furniſh that information, which when received, ſhall be tranſmitted to the Society; but I am to add,

add, there is very little probability of its being imported into England with any advantage, owing to the very high rate of freight from China.

I am, Sir,

Your moſt obedient humble ſervant,

THOMAS MORTON.

Eaſt India Houſe,
Jan. 3, 1787.

Mr MORE.

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The many important uſes to which Hemp is applied, and the very great price of that article at preſent, render the conſideration of obtaining a proper ſupply of it, an object of the firſt importance; and in order fully to aſcertain the value of this Material from China, in our Manufactures, ſome of it has been ſent, by the Society, to a principle Manufacturer of Sail Cloth, whoſe ſentiments thereon will be laid before the public at ſome future period.

PAPER

IN

MECHANICKS.

MECHANICKS.

IN the year 1769, a Bounty of fifty Guineas was voted to Mr. Weſtgarth, for his invention of an Hydraulic Machine, which was then ſtrongly recommended by Mr. Smeaton, as will be ſeen by his letter, dated April 29 in that year.

Although, from that time, a Model has remained in the Society's Repoſitory, no account of the Machine has hitherto been publiſhed, by which the ſeveral contrivances can be clearly underſtood, but Mr. Smeaton having obliged the Society with a full deſcription, and cor-

rect drawings of all the parts, the whole is now ſubmitted to publick inſpection, as likely to prove of very conſiderable advantage in many ſituations, particularly among the Mines in various counties in theſe Kingdoms.

The Society, fully ſenſible of the Merits of Mr. Smeaton's account, voted him their thanks, and a Silver Medal, for the particular care he had taken in the deſcription of Mr. Weſtgarth's Machine, and for the attention he has ſhewn to the views of the Society in this inſtance.

The

The Repreſentation of JOHN SMEATON, *Engineer, concerning the* HYDRAULIC ENGINE, *invented by* Mr. WILLIAM WESTGARTH, *of* Colecleugh, *in the County of* Northumberland, *for raiſing Water by Water.*

MR. SMEATON, begs leave to advertiſe his friends and acquaintance, as well as all thoſe who are deſirous of promoting the ſucceſs of good mechanical inventions, that they will find the Engine, the Model of which will be exhibited by Mr. Weſtgarth, to be highly worthy of their attention and regard; being in his opinion, one of the greateſt ſtrokes of art in the Hydraulic way, that has appeared ſince the invention of the Fire Engine. This Machine is founded on one of the moſt ſimple principles of ſtatics, viz. that of an heavier co-

lumn of Water, preſſing up, or raiſing a lighter; an idea, which though proportinably obvious, as it is ſimple, and therefore far from new, having been adopted by ſeveral eminent Mechanicks; yet it has been reſerved to Mr. Weſtgarth, to form the proper expedients, and obviate thoſe difficulties, which attended the practical execution of machines intended to work on this principle; and which contrivances are (as to my knowledge) not only new and peculiar to Mr. Weſtgarth, but which alone have contributed to its ſucceſs: and therefore, though the whole compoſition dependant thereon, is highly deſerving a patent, or excluſive privilege, yet Mr. Weſtgarth, chuſing rather to exhibit and communicate his invention to the publick, ſeems, for that very reaſon, the more highly deſerving a reward from the patrons and encouragers of art; and the more worthy of

proper

proper notice, as he has not been hasty in communicating his invention until the value thereof has fully appeared, by a number of Engines built at large and applied to real use.

Independant of the various draughts, experiments, and essays on models, which, as I am informed, Mr. Westgarth, had in hand, for years, prior to his attempting a Machine in large; I had the pleasure of seeing the first compleat Machine of this kind at work, for draining or unwatering a Lead Mine, belonging to Sir Walter Blackett, at Colecleugh, aforesaid, in the summer of the year 1765; since which time, that Machine has been shewn to all those who had the curiosity to see it. He has now erected four others in the different mines in that neighbourhood, one of which I have seen, and all attended with equal success, as I have great rea-

ſon to believe, not only from the nature of the conſtruction, but from the reports of thoſe for whom they have been erected. This machine is not only peculiarly adapted to the raiſing of Water by Water for draining of Mines, but the ſame principle can readily be extended to the raiſing of Water for ſupplying towns, gentlemen's houſes, &c. and univerſally for raiſing Water from any depth, wherever a fall of Water can be procured; and particularly in thoſe caſes where the fall is great; that is, where it exceeds thirty or forty feet, it will, in my opinion, not only exceed all other known Machines in effect, but in ſimplicity; and that whether the quantity of Water to be applied is great or ſmall. I therefore think this Machine is not only very curious in itſelf, but will be of great advantage to the publick.

J. SMEATON.

Auſthorpe,
April 29, 1769.

Deſcription of the Statical HYDRAULIC ENGINE, *invented and made by the late* Mr. WILLIAM WESTGARTH, *of* Colecleugh *in the County of* Northumberland, *by* J. SMEATON, F. R. S.

THE firſt of theſe Engines, was compleated by Mr. Weſtgarth, for the uſe of draining or unwatering a Lead Mine, at Colecleugh, belonging to the late Sir Walter Blackett, Bart. whoſe principal agent he was for that, and the reſt of his Mines in that neighbourhood. It was firſt ſet to work in the year 1765, and was at once attended with compleat ſucceſs; and I believe continues a working Engine at this day. In conſequence hereof, he was called upon by the Miners of the neighbouring Manor of Alſton-moor, belonging to Greenwich Hoſpital, to conſtruct Machines of the ſame kind, in ſuch ſitua-

ſituations as ſeemed elegible; and three or four more of the ſame ſort, were alſo made with ſucceſs in the courſe of three or four years, which induced Mr. Weſtgarth to think of applying for a patent for the excluſive privilege of uſing this invention; but previous thereto, he was pleaſed to adviſe with me concerning it, being at that time frequently in thoſe parts of the country, as an agent of Greenwich Hoſpital.

Much as I admired the ingenuity of Mr. Weſtgarth's invention, I diſſuaded him from the thoughts of a Patent; as it would take a length of time to be ſufficiently known, and the number of caſes in which it could be properly applied, were not ſufficient to be likely to afford ſuch a number of premiums, as might defray the expence of a Patent, with a proſpect of advantage to himſelf and family.

mily. I therefore recommended it to him, as the Society for the Encouragement of Arts, Manufactures, and Commerce, were, by handſome premiums and bounties, encouragers of all uſeful inventions and improvements, to communicate his invention to them, that it might be made publick; in confidence that he would obtain a bounty for the ſame, of ſuch value as to the Society ſhould ſeem meet: and in conſequence hereof, I gave him a repreſentation of the utility of his invention, with which, in the year 1769, he applied to the ſaid Society, and obtained a Bounty, upon condition he delivered to the Society, a working model, and a draught, ſhewing the conſtruction of the Engine; but as the death of Mr. Weſtgarth, which happened not long after, prevented the uſefulneſs of the Machine, from being ſo ſucceſsfully ſpread, as it otherwiſe doubtleſs would have been; and as ſome of

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the moſt eſſential parts of the Machine, cannot be ſeen in the model, without its being taken to pieces; and the drawing not being accompanied with any literal explanation, nor the detail of it ſufficiently made out. At the requeſt of the Society, I have now ſupplied thoſe defects, that it may be publiſhed in ſuch a manner, that the utility of it may be ſeen; and the means of making and applying it in a proper ſituation, explained.

The Hydraulic Engine, the moſt in uſe in the Mines, is vulgarly called the *Bob-gin*; and from the ſimplicity and eaſy application thereof to the ſituations and purpoſes of Mines, has been in uſe amongſt them, beyond the reach of any traces concerning its origin: It conſiſts of a Waterwheel, moſt commonly overſhot; a ſingle Crank or Winch, at one or at both ends of the Axis as occaſion

caſion may require, for the application of one or two balances, for the working of one or two pumps. Nothing can be more commodious in mountainous countries, when there is often great plenty of fall, and not an abundance of water.

There is however a limitation to the extent of the uſe of this Machine: for, when for the ſake of making the beſt uſe of a ſmall quantity of water, it would require the Water-wheels to exceed forty feet in diameter, or height, then they become ſo heavy, unweildy, and expenſive, as on thoſe accounts to be inelligible; and they rarely exceed fifty feet *. Where therefore a rich Mine, a neceſſity of power, and a ſcarcity

* The largeſt I ever ſaw, was in Cornwall, and forty-eight feet diameter; the largeſt I ever conſtructed is forty-ſeven feet.

city of water concur; in former times, (before the uſe of fire engines) they frequently placed Water-wheels of a moderate ſize one above another; taking their water in ſucceſſion, and uniting their powers in one; but in this way, when more than two or three wheels are neceſſary, the Machine ſtill becomes unweildy and expenſive*. It was therefore

* When I was firſt in Cornwall, in the year 1757, I was there told of a famous Engine, that had been worked in the memory of thoſe alive, but of which no traces were remaining; it was called the *Tower Engine*; and conſiſted, as well as I remember, of ten water-wheels, of twenty feet diameter, one above another, ſo that it required a building in the form of a tower to contain them. Every water-wheel, being furniſhed with its proper cranks, they were all united in their efforts by two ſpears common to all, which ultimately acted upon two pumps. I ſaw myſelf, on that journey, two water-wheels one under, and taking its water from the other, which (if I rightly remember) were forty-five feet diameter each; each working by a ſingle crank, a ſingle pump which lifted the water to each other. What an expence might here have been avoided, had they been acquainted

fore a Deſideratum, by way of ſupplement to the water-wheel, to have a Machine on ſuch a conſtruction, that would take in an unlimitted perpendicular fall, with any quantity of water however great or ſmall *: And efforts have not been wanting to produce a ſtatical Machine, whereby a heavier column of water might overcome and raiſe a lighter; but the means of conſtructing a Slide, Cock,

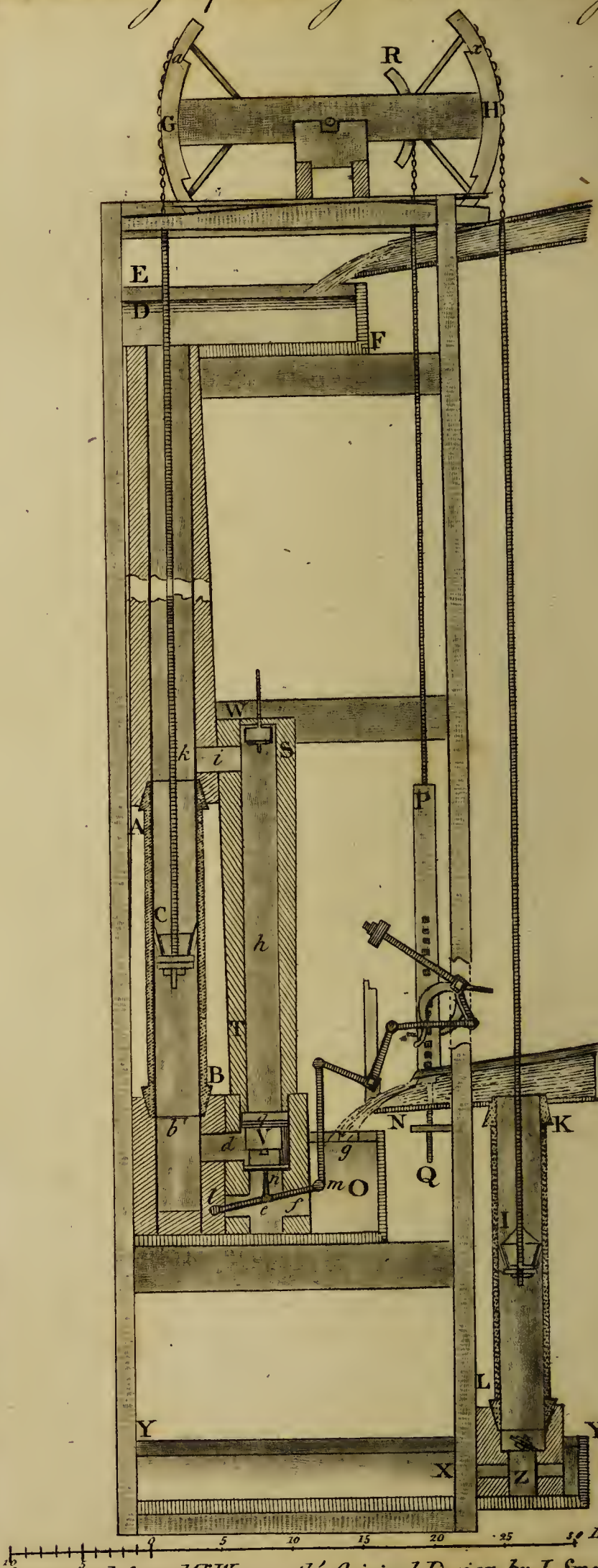
quainted with Mr. Weſtgarth's conſtruction; for beſides the expenſe of machinery, that of cutting out, and ſupporting the ground for the caſe, or cavity, wherein theſe wheels worked, being both under ground, will be ſeen by the experienced Miner, to have been no ſmall matter.

* About ſeventeen years ago, I erected an Engine upon Mr. Weſtgarth's principle, at Templenewſam, the ſeat of the Right Honourable Lord Viſcount Irwin, in Yorkſhire, for ſerving the houſe with Water, from an eligible ſpring. The perpendicular deſcent of the Water made uſe of as a power, was ſixty-ſeven feet; and the quantity expended at each ſtroke of the Engine, being only a ſingle Pint, ſhows how ſmall a quantity of water, may be uſefully em-

Cock, or Valve, whereby the preſſure of the acting column, might be alternately left at liberty to act, and its action ſuſpended, ſo as to do its buſineſs without too much friction, or wear in conſequence of it, was left to the invention of Mr. William Weſtgarth, who happily conceiving the idea of conſtructing a ſliding Valve in the form of a Cylinder, the action of a column of water upon its external ſurface, being equal all round, would have no tendency to drive it towards this ſide or that: And in this particular, the peculiar merit of his invention conſiſts.

employed in this mode of conſtruction.—This Engine delivers alſo a pint of water at each ſtroke into the reſervoir at the houſe; which is elevated above the ſpring, nearly half the perpendicular that the acting water deſcends; the diſtance being about two hundred and fifty yards: and as it will go ſixteen ſtrokes *per* minute, the water delivered amounts to eight barrels, beer meaſure; or fifty-five hogſheads *per* twenty four hours.

General Design of Mr. Westgarth's Statical Engine.



Contracted from Mr. Westgarth's Original Design by J. Smeaton 1787.

MECHANICAL DESCRIPTION OF THE ENGINE.

PLATE. No. 1. is a reduction of Mr. Weſtgarth's drawing, which accompanied his Model; it is therefore not to be conſidered as a deſign for an Engine in real ſervice; but the Model being made to a ſize ſufficient to work, it will be equally comprehended by the intelligent artiſt, how it is to be applied, as if it was a drawing of an Engine at large.

AB is a working Barrel, which, for the ſake of diſtinction we will call the working Cylinder.

C. denotes a Bucket or Piſton, without perforation*, being leathered upwards,

* A ſmall hole through it, with a bit of leather upon it as a valve, was uſed by way of giving an occaſional paſſage to the air from below upward.

ſo as to prevent the water of a column reſting upon it, from deſcending, without the deſcent of the Piſton itſelf.

CD repreſents a column of water reſting upon the Piſton, of any perpendicular height that is required, or that the ſituation admits of; being held in by the different lengths of pump-trees, that are placed above the working Cylinder; at the top of which is

EF a Ciſtern for receiving water from the ſupply or ſource.

Now ſuppoſe for a moment, that the working Cylinder was open at the bottom, that the Piſton ſupported by its rod or ſpear was ſuſpended by a proper chain upon the arch head G, of

GH the working beam, from whoſe end H by a ſimilar Chain, the ſpear HI

deſcends

deſcends down to I, which denotes the Bucket of an Engine-pump, with valves or falls, opening upward, as in common.

KL denotes the working Barrel of a common Engine-pump; which is placed within the preſſure of the atmoſphere, above the bottom of the mine or ſhaft, with as many lengths of pump-trees upon it, as will bring it up to the level of the drain, or ſough, by which the water of the Mine is to be diſcharged. The Trough MN is ſuppoſed to diſcharge the water from the Pump, into the Ciſtern O, placed at that level. Now it is evident by the conſtruction, that if the column of water CD is of a greater hydroſtatical weight, than that in the column of the Pump, the heavier column will overcome the lighter; and the column CD by deſcending, will raiſe the column of water in the Pump, and diſcharge it into the Ciſtern O: and the

Piſton C will continue deſcending, until, to prevent its getting below the working Cylinder, the arch head G is ſtopped by its pin at a; and in this poſition the Machine muſt ever remain, without the intervention of art.

If inſtead of the working Cylinder being open, as firſt ſuppoſed, it is connected with the pipes, b, d, e, f, which for the preſent moment may be ſuppoſed all open; then, if the ſeveral cavities under the Piſton, be ſuppoſed filled with water; this water, having free paſſage out at f, will not impede the deſcent of the Piſton, but diſcharging itſelf at f, riſe up at the Ciſtern O, until it runs over at the diſcharging place g, and there runs off into the ſough, along with the water diſcharged from the Pump. The Piſton will nevertheleſs remain in the ſame poſition wherein we before left it.

Suppoſe

Suppoſe V to be a cylindrical valve, made to ſlide up and down upon the outſide of another hollow Cylinder; and that by means of ſquare holes through the ſame as repreſented under the valve V, the water communicates freely from the pipe d, to the pipe e, then there will be nothing to hinder the effect I have juſt decribed. But if we ſuppoſe that the valve V, is ſlided down, ſo as to cover thoſe holes, and at the ſame time, another ſet are opened above the ſliding valve, perfectly ſimilar to the former; but that there is a diaphragma, or ſtop in the bore of the inner Cylinder, betwixt thoſe two ſets of holes; ſo that there is no communication for the water, from the upper to the lower part of that Cylinder; then if there is by this means a communication opened between the pipe d, and the pipe h, through the upper ſet of holes; and alſo an open communication from the pipe h,

through the pipe i, to the pump-tree at k; if the weight of the ſpear HI is heavier than that of G, C. and ſufficiently ſo to overcome the friction of the Piſton, Bucket, &c. there will then be nothing to hinder the Bucket from aſcending, becauſe the weight of the whole column DCb is ſupported and ſtopped from flowing out through the lower ſet of holes by the valve V, which now covers them: and there being nothing therefore to hinder the water diſplaced by the aſcent of the Piſton, from making its way progreſſively from the pump-trees at k, through i, h, d, and b, and ſo filling up the ſpace left by the Piſton; it will continue riſing, until, to prevent the Piſton's getting out at the top of the working Cylinder, the Arch Head H, is ſtopped upon the ſpring frame by its pin at x; and here again it muſt remain, until a new modification of the parts takes place. It

is

is obvious, that if the valve V, is slid up again into the situation the figure represents it, that the column D Cb again preponderating, will make a fresh stroke, and so *toties quoties*.

It is now proper to enter into a more particular explanation of the cylindrical Valve; and as Mr. Westgarth has given no enlarged drawing thereof, I have endeavoured to supply this, by what is contained in Plate No. 2. wherein Fig 1, represents the section, and Fig 2, the plan thereof, the letters refering to the same things in both.

AB, BA, represents the section of the sliding valve marked V, in the Plate No. 1. being an hollow Cylinder, truly bored in the inside; and open at both ends.

CD, EF is alſo an hollow Cylinder whoſe external ſurface is truly turned and wrought; ſo that the Valve may juſt ſlide eaſily upon it, without ſticking in any part.

CG, DG and EG, FG ſhew two flanches caſt in the ſolid upon each end of the internal Cylinder; which is in reality made of two pieces, for the ſake of getting the external Cylinder upon it; each piece having its own bottom: theſe are joined together by ſcrews, with a piece of thin leather, or oiled parchment between them.

HI is the bottom of the part of the Cylinder FHIE; and KLMN, is the bottom of the part of the Cylinder, CKLMND, leaving a groove round the Cylinder, whoſe ſection is O P: and thoſe bottoms form the ſolid diaphragma, or ſtop, by which all communication of water between the upper cavity of the Cylinder and the lower, is cut off from the lower.

QQQ, ſhew the places of three of the four ſquare openings, that are pierced through the ſides of the upper cavity of the internal Cylinder, and which, in this poſition of the cylindrical valve are covered thereby.

RRR, ſhew the places of three of the four ſquare openings, pierced through the ſide of the lower cavity; and in this poſition of the valve, are ſhewn as open.

ST, ſhews an iron bar affixed to the valve, and working through two ſlits cut through the under part of the interior cylinder, as VW, VW; this bar being laid hold of at the hole X, by an upright bar connected therewith, and its lower end with the lever, marked lm, in Plate No. 2. it is manifeſt how the motion of the valve V is managed by the rod attached to the lever lm, whoſe

whoſe end m, coming out into the water of the open ciſtern, and being there laid hold of by the upright rod, the motion of the valve up and down, can be communicated from the common Tumbling Geer, as uſed in the Fire Engine; and the valve is made to open one ſet of holes, and ſhut the other alternately, at the end of each ſtroke of the Engine, by means of the plug frame P Q dependant from the little arch R, upon the working beam, in the ſame way as in the Fire Engine, which is diſtinctly ſhewn by the figure itſelf.

In conſidering the particular conſtruction of the valve Plate, No. 2. it is taken for granted, that the joint between the cylindrical valve, and the inſide cylinder upon which it ſlides, is perfectly water tight, notwithſtanding its ſliding motion; for if we ſuppoſe it not perfectly ſo, then the

the water acting through the holes Q QQ and percolating through the crevice between the cylinders, will in effect open a partial communication between the upper cavity and the lower; and consequently whatever this quantity is, will be a constant waste of water, from the source to the cistern O, without doing any work: and though superior artists might possibly effect such a movement, yet it is not to be expected from the sort of workmen usually employed about hydraulic Engines in mines; and even if effected, as the continual wear of the parts would render the cavity of the valve larger, and the internal cylinder less; without some principle of accommodation to the rigidity of the materials, if delivered water tight out of the artificer's hands, they could not be expected long to remain so, after being in use. Such a principle of accommodation,

Mr

Mr Weſtgarth's ingenuity and ſagacity provided, and introduced in the following manner.

The groove OP, is ſhewn to contain the ſection of a leathern ſtrap a b, ſuch leather as bridle-reins are made of, is fit for this purpoſe; a piece is cut, whoſe breadth is the ſame as the height of the groove, and whoſe length is about an inch, or rather better, longer than the circumference of the Cylinder. The two ends are to be thinned off in form of a wedge, but when brought together and overlapped, they will form nearly the ordinary thickneſs. A ſtrip of thin plate copper is alſo to be provided, whoſe breadth is ſuch as to go freely into the groove, and whoſe length is ſomewhat leſs than the circumference of the Cylinder; ſo that the leathern ſtrap being put into the cylindrical valve,

and

and the ſtrip of copper (rendered circular) within it, the two ends of the copper are not to come quite in contract. The ſtrip of copper being ſuppoſed to have been rendered elaſtic by being well hammered, and ſet to a circle larger than that of the valve; when the ſtrap is confined within the ſliding valve, and the ſtrip of copper within the ſtrap, the conſtant endeavour of the copper-ſlip will be to enlarge the circumference of the ſtrap; and by cauſing it to ſtick cloſe to the internal circumference of the valve, it will cloſe the joint between that and the external ſurface of the internal Cylinder; and effectually prevent the water getting down between the two Cylinders; and will enlarge itſelf in proportion to its own wear, and that of the braſs work wherewith it is in contract.

Furthermore,

Furthermore though all communication is by this means prevented from the upper immediately to the lower cavity; yet if the water acting through the holes QQQ, and through the crevice QE, QF, is not ſtopped by a water-tight joint between the upper end of the valve BB, and the flanch FG, EG, the water making its way there into the general ſurrounding cavity, that contains the whole valve, will be at liberty to get through the lower holes RRR; and thence into the Ciſtern O; of the general deſign N°1. In like manner when the valve is down' if there is not a water-tight joint between the lower end of the valve AA, and its ſeat upon the lower flanch CG, DG, the water would eſcape from the ſurrounding cavity, through the crevice between the two Cylinders, and through the holes RRR, into the ſaid Ciſtern O. To prevent which

which, Mr. Weſtgarth, has introduced rings of flat leather upon both the flanches, to make good the ſeat of the valve, whether up or down; which rings of leather may be held down by braſs rings, whoſe ſections are repreſented at yy, zz, confined down by ſcrews: and theſe flat leathers ſerve a further purpoſe; for being made about half an inch larger than the circumference of the flanches, thoſe borders turned up, maintain a water-tight joint, between the valve and the general cavity in which it is lodged; marked in Plate No. 1. nq, and by unbolting and taking off the ſide pipe ST, the valve may be got at, taken out, and inſpected at pleaſure.

At W is repreſented a round block of wood, which by a ſcrew can be lowered at pleaſure; and as it is introduced in Mr. Weſtgarth's drawing, needs ſome explanation

nation. I conceive it to be an expedient peculiar to the model (of which the drawing, as I have already hinted, is the deſign) to regulate the riſe of the piſton; which as it cannot riſe faſter, than the water can get round, from above to below it; by letting down this piece of wood, the paſſage i, can be ſo ſtraightened as to prevent the Piſton from riſing ſo ſuddenly as to diſorder the Working Geer. This in the work at large, is ſcarce neceſſary; becauſe this matter may be ſufficiently managed by the poize of the parts; whereas in the model, the friction bears ſo great a proportion to the whole power, that a ſmall difference of reſiſtance, will either make the Machine ſtick faſt, or allow it to go with too much rapidity; unleſs there is ſome curb upon it that will take place in proportion to its velocity.

To give the ingenious reader ſome idea of the real proportion of the parts, it may be

be proper to ſay, that in the Colecleugh Engine, according to the beſt of my memory, the working Cylinder was ten inches diameter, the deſcending Pumps were from twenty to thirty fathoms; and when the column of the Pump, was about half the hydroſtatical weight of the deſcending column, the Engine would go ten or twelve ſtrokes of ſeven feet each, per minute.

The working Beam was about twelve feet long.

The water ſhewn in the Ciſtern Y X Y, in the Model, is to repreſent the water generated in the mine; and from thence flowing to the Pump-foot at Z; to which is ſuppoſed to be annexed a proper length of ſuction pipe, according to circumſtances.*

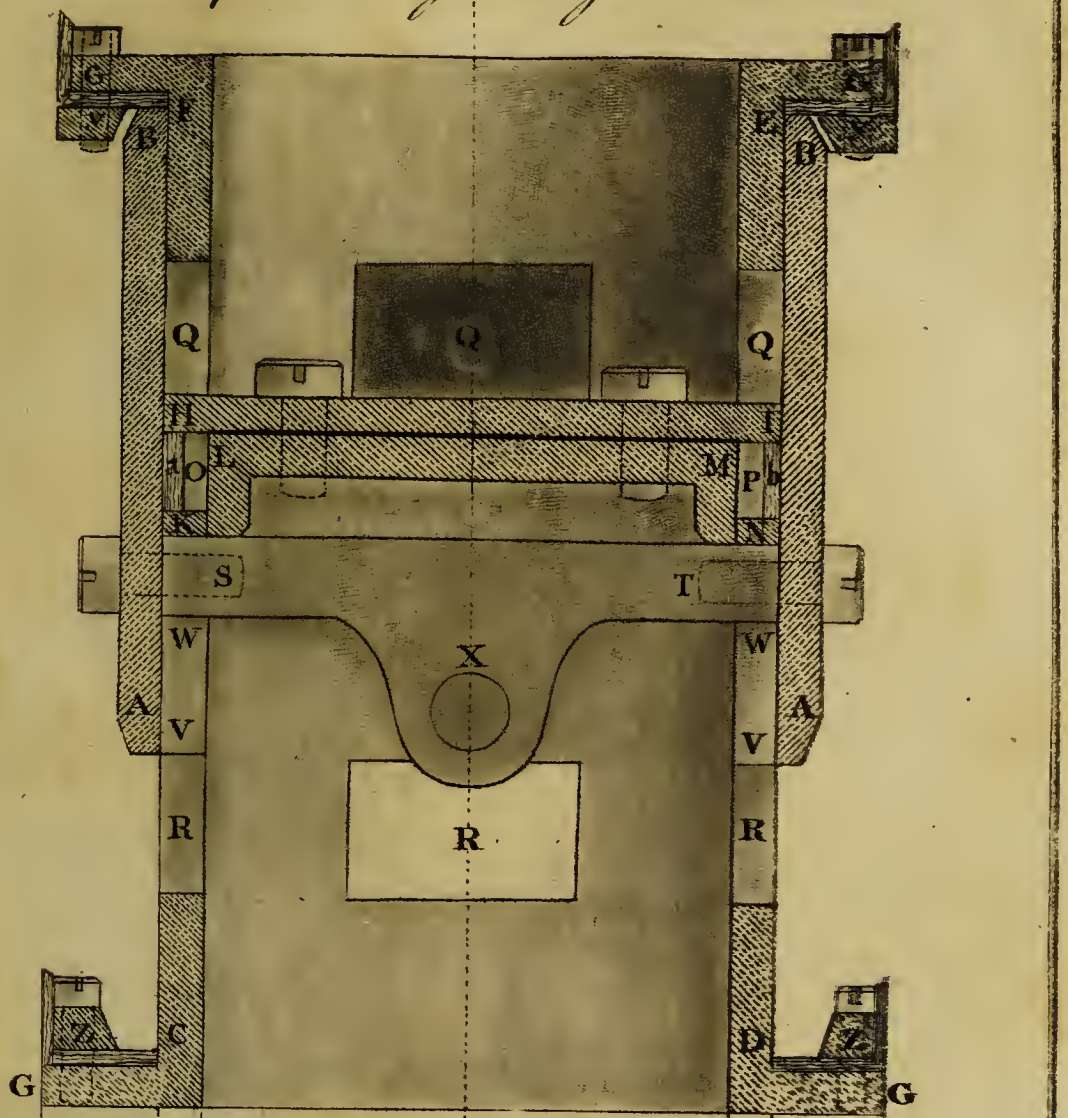
* On ſeeing this Engine in the Year 1765, Mr. S. ſuggeſted to Mr. W. that if this Engine, inſtead of the *Great Lever*

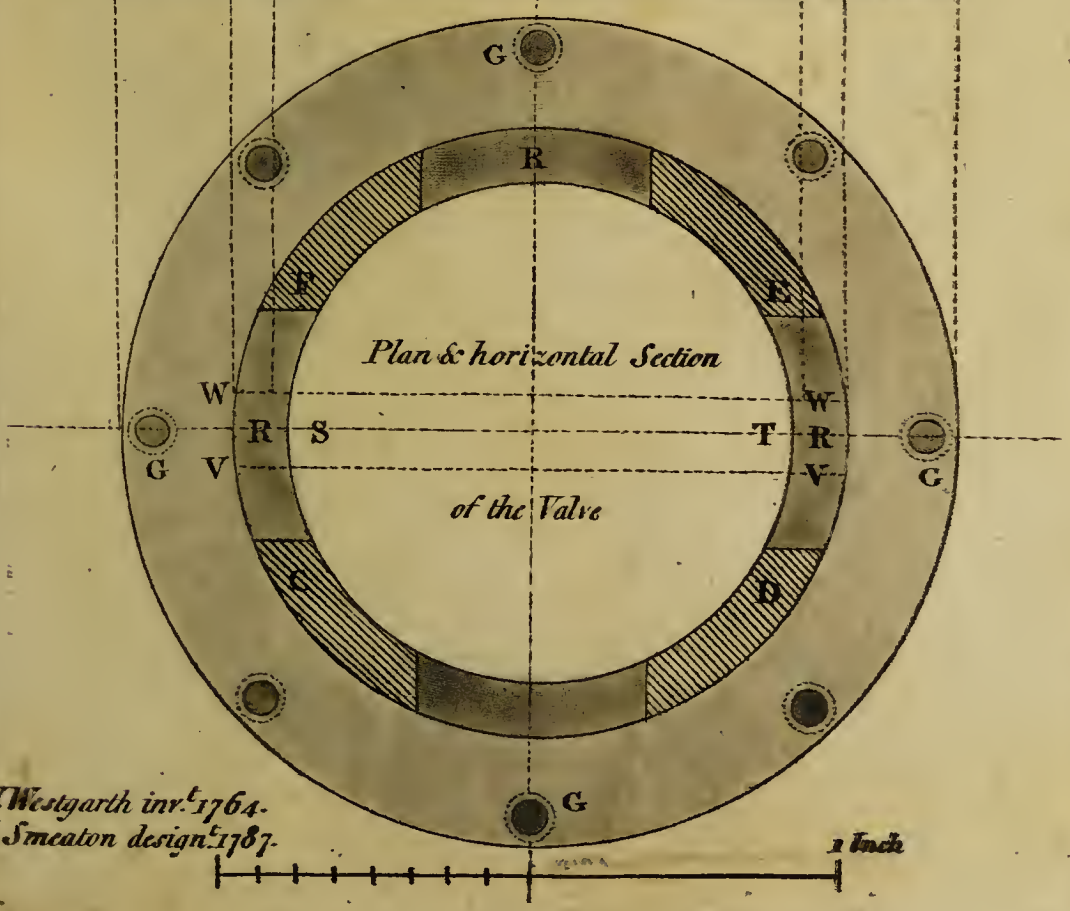
N. B. It may be proper to remark, that the ſcale of the valve, Plate No. 2. is ſixteen times larger than that of No. 1. and that a valve of four inches diameter is found ſufficiently large for a working barrel of eight inches.

Lever was made to work with a *Wheel:* and inſtead of the long Spear going down the deſcending Pump-trees, the Piſton was made to communicate with the main chain through a collar of leathers, or *Stuffed Collar*, in the manner of (what is called) a *Jack-Head* Pump; that then the whole of the Machinery would ſtand together juſt above the *Level* or *Sough*, and there would take up leſs room, as the work might in general be comprehended within the limits of the *Shaft*, and the deſcending Pumps might alſo be of a leſſer bore, and be fixed in a corner of the Shaft, and therefore be upon the whole, much more convenient for under-ground works; and in this mode, the lateſt Engines of Mr. Weſtgarth, were actually conſtructed with ſucceſs.

PAPER

Section of Mr. Westgarth's cylindrical Valve.





W. Westgarth inv.t 1764.
J. Smeaton design.t 1787.

1 Inch

PAPER

IN

COLONIES AND TRADE.

COLONIES AND TRADE.

IN the year 1774, the Society received, from one of their correſponding members in Jamaica, a Caſk of Red Earth, a proper quantity of which was ſent to ſeveral architects, for trial. No report of the ſucceſs of the experiments was made, until the letters from Mr. Mylne, dated November 30, 1784, and February 28, 1786, were received; for which thanks were returned to Mr. Mylne.

As the uſeful properties of this Earth are now aſcertained, and the diſcovery of ſuch a material may be

of very extenſive ſervice to the iſland of Jamaica, and other parts of the Weſt Indies, although the expenſe of freightage may preclude the uſe of it here, it has been judged proper to publiſh the following letters from Mr. Mylne, on the ſubject; with a copy of the letter, written by the Secretary, to thoſe gentlemen to whom the Earth was ſent for trial, which letter contains an extract of the account, originally received by the Society, of the Earth, and manner of uſing it.

Adelphi

Adelphi Buildings, Nov. 3, 1774.

SIR,

THE Society for the Encouragement of Arts, Manufactures and Commerce, have lately received from Jamaica, a quantity of Red Earth, and I am directed to ſend ſome of it to you, and requeſt the favour of you to oblige the Society with your opinion of it. The gentleman from whom it comes, thinks it a kind of *Puzzolana*, and deſcribes his method of uſing it as follows. "To one meaſure of the Red Earth, add two of the ſame meaſure of well ſlackt lime, and one of ſand, and then let them be well mixed and wrought like common mortar, with fair water, and ſo made up in a heap, but in about eight hours it will begin to acquire a hardneſs, and the

heap muſt be cut down, and well wet with water, and ſmartly worked and mixed over again, and ſo ſmartly worked and wet morning and evening, for a whole week, before it is fit for uſe; and after it is laid on, it muſt be ſtrictly attended while it drys and hardens, to cloſe any crack that may appear in the drying, for about forty-eight hours, and then it is generally out of danger."

"But if any cracks, &c. ſhould appear after it is quite dry, as ſuppoſe the covering of a building, ciſtern &c. a labourer, with a little ſand or brick duſt, and a little common whitewaſh, thrown over the crack and ſmartly rub'd in with a brickbat, or ſandy ſtone, the crack will ſoon diſappear, and the work will be as good as ever."

"Ciſterns, Reſervoirs, Canals, and all manner of conveniences to collect rain water

and

and retain it, of any reaſonable dimenſions, may at a very ſmall expenſe be made, and completely finiſhed with this compoſition, to contain and ſecure rain water."

"By means of this compoſition, a mortar may be made (far exceeding any other) wherewith to lay the foundation, and raiſe the ſuperſtructure of any dam, bridge, or guttering; and in ſhort, any kind of building where water, or any kind of liquid is to be concerned, becauſe the ſoft new made mortar will harden, and ſoon become like a ſtone totally immerſed in water."

"Of this compoſition may be made the beſt coverings for all manner of buildings, witneſs my own houſe, that has been covered with this compoſition (though not at that time brought to its preſent perfection

tion) theſe twenty years, and is not a pin the worſe."

"In regard to matters of pleaſure, Terras Walks, Canals, Flower Pots, Urns, Obeliſks, Statues, and even Colloſſal Statues, and other ornaments for gardens, may be made of or with this compoſition, as it reſiſts rain, and every ſort of moiſture, and nothing but violence will make the leaſt impreſſion, ſo that the five orders of architecture, with their various ornaments, may be moſt elegantly expreſſed on the outſide, or inſide of buildings, in the plaiſterers way, and laſt for ages, if no violence is uſed to them."

"In covering a building, I would chooſe to lay it on ſix inches thick, upon a flat ſtrong framed well lathed roof, as it will ſhrink in drying, and is the beſt and

and cheapeſt covering I know of, as I have experienced ever ſince 1747."

Thus far the account from the perſon who ſent it, and beg leave to ſay that if you require any larger quantity for tryal than is now ſent, it will be furniſhed to you by your applying to the Society.

I am Sir,

Your very humble ſervant,

SAMUEL MORE, SECRETARY.

MR. MYLNE.

SIR,

SIR,

I have made a fair trial of the Puzzolana Earth, received ſome years ſince from the Society for Encouragement of Arts, Manufactures and Commerce, and although it has lain long by me, it turns out a very good ſubſtitute to Dutch Terras, or Italian Puzzolana, for works immerſed in water. As you have informed me, there ſtill remains a quantity of it in the Society's poſſeſſion; I ſhall be glad of ſome to make further trials in other ſituations, and ſhall be glad to know the particular place in Jamaica from whence it came, and the chriſtian name of Mr. Brown, by whom it was ſent. It was tried againſt ſome Britiſh materials, and proved far better than any of them.

I am Sir, your very humble ſervant,

ROBERT MYLNE.

New River Head
Nov. 30, 1784.
MR. MORE.

SIR,

I have it now in my power to write you decidedly on the Red Earth, of which I received a ſpecimen for trial in water-works.

I have put it to very ſevere trials, and have found it anſwer extremely well, as a ſubſtitute for Dutch Terras, or Puzzolana Earth from Italy, they are all three volcanick ſubſtances, and have the ſame peculiar qualities. Beſides what I received from you, I obtained by means of a friend, a quantity from Jamaica, which on comparative trials, proved the ſame as that you ſent me, it is found in vaſt quantities on the eſtate of Mr Brown, in the pariſh of St. Elizabeth, in Jamaica. There are many acres of it, for it lies on the ſurface of the ground; in this it is dif-

ferent

ferent from Puzzolana, which lies in Strata, under ground like coal. Dutch Terras is a *Tufa* Stone, found on the rocky banks of the Rhine, and rduced to powder, by Mills in Holland.

Mr. Brown, who ſent this Jamaica Terras to the Society, is now dead, and the eſtate on which it is found is called Dettingen and is now the property of his ſon, a very intelligent gentleman.

On enquiry into the means of bringing it into this country I find the expenſe of carriage to the water-ſide there, and freight to this country will prevent the uſe of it here. I wiſh it however to be made as publick as poſſible. It may be of uſe to the inhabitants of the Weſt-India Iſlands and ſome other of our colonies.

I am Sir, your very humble ſervant,

New River Head, ROBERT MYLNE.

Feb. 28 1786.

REWARDS

ADJUDGED BY THE

SOCIETY,

IN

M,DCC,LXXXVI.

REWARDS

BESTOWED IN

AGRICULTURE.

Claſs 29. TO THOMAS WHITE, Eſq; for having planted in the year 1784, thirty-ſeven thouſand, two hundred and thirty Alders, on thirty acres, four perches of land, on his eſtate at Butsfield, in the pariſh of Lancheſter, Durham. The GOLD MEDAL. See a particular account of this plantation, page 5.

To Mr. JAMES PYKE, Watch Maker, at Newton Abbot, Devonſhire, for his new invented Chaff Cutter,

TWENTY GUINEAS. See a Deſcription and Plate of this Machine, page 65.

POLITE AND LIBERAL ARTS.

Claſs 120. HONORARY PREMIUM. to MISS ELIZABETH SMITH, Great George Street, Weſtminſter. The GOLD MEDAL. Subject, THE HOLY FAMILY.

Claſs 121. HONORARY PREMIUM, to MISS ANN WHITEHEAD, Baſinghall Street. The SILVER MEDAL. Subject, A PORTRAIT OF SIR PETER PAUL RUBENS.

Claſs 132. DRAWING OF BIRDS, to Mr. JOHN LEWEN, Stepney Green. The LESSER SIL-

SILVER PALLET. Subject, A HAWKE, AND SMALL BIRDS.

Class 140. TEACHING LANGUAGES, to JAMES EGAN, L. L. D. Royal Park Academy, Greenwich, Kent. The GOLD MEDAL. For teaching the Latin Language expeditiously and correctly. See a more particular account, and the letter from DR. EGAN, page 111.

Class 144. PROFICIENCY IN LATIN. To MASTER RICHARD BURLEIGH AT DR. EGAN'S Academy. The SILVER MEDAL GILT. For Writing and Conversing

verſing correctly and fluently in Latin.

PROFICIENCY IN LATIN. To MASTER JOHN WILSON, at DR. EGAN's Academy. The SILVER MEDAL. For Writing and Converſing,c orrectly and fluently, in Latin.

PROFICIENCY IN LATIN. To MASTER GEORGE WILLIAM Mc. DONALD at DR. EGAN's Academy. The SILVER MEDAL. For Writing and Converſing correctly and fluently, in Latin.

PROFICIENCY IN LATIN. To MASTER THOMAS THOMASON, at DR. EGAN's Academy. The SILVER MEDAL. For Writing, and Converſing

cor

correctly, and fluently, in Latin.

PROFICIENCY in LATIN. To MASTER JOHN REDCROSS, at DR. EGAN'S Academy. The SILVER MEDAL. For Writing and Converſing correctly and fluently, in Latin.

To MISS MARY LINWOOD, of Leiceſter. The SILVER MEDAL, for ſubmitting to the inſpection of the Society, as examples of works of art, and of uſeful and elegant employment, three pieces of Needle-work, repreſenting a HARE, STILL LIFE, and a HEAD OF KING LEAR, from a painting by Sir Joſhua Reynolds.

To Miss Emma Jane Greenland, Newman Street. The Gold Pallet. For communicating the ancient Grecian manner of Painting. See the account, page 105.

To Mr. Griffiths James Cheese, Organiſt at Mancheſter. The Gold Medal. For his improved Machine for teaching Blind Perſons Muſic. See the account, and plate of his machine, page 125.

To Mr. Theodore Elliott, Liſſon Green, The Leſſer Silver Pallet. For a painting of Shipping.

M A-

MANUFACTURES.

To Mr. William Lepard, Newgate Street. The Silver Medal, as a mark of the Society's approbation of his attempt, to accompliſh the intention of the Society, in offering the premium for making, in England or Wales, Paper for taking impreſſions from engraved copper-plates equal to that imported from France.

To Mr. Luke Green, Marſham Street, Weſtminſter. Five Guineas. For a new Manufacture of Caps, made of wool, and felted as for hats, but ſofter, and more elaſtic.

MECHANICKS.

To a young Lad now abroad, whoſe name is yet unknown, two GUINEAS for a ſmall model of a Ship, cut with a knife.

To MR. WILLIAM RICH, Yalding, Kent, THREE GUINEAS, for a Nail and Bolt drawer. A more particular account of this Tool will be given in ſome future volume.

PRE-

PRESENTS

RECEIVED BY THE

SOCIETY,

In the YEAR MDCCLXXXVI.

With the Names of the DONORS,

BOOKS.

SAMUEL EWER, ESQ.

A Courſe of experimental Philoſophy, by I. T. Deſaguliers F.R.S. 2 vols. quarto, third edition.

SOCIETY

SOCIETY INSTITUTED AT BATH, FOR PROMOTING AGRICULTURE.

A book of the rules, and orders, and premiums, of the Society for promoting Agriculture at Bath.

WILLIAM FRANKLAND, ESQ.

The ſeventh volume of a work in French, entitled, Machines approvees par L' Academie. Quarto.

N. B. The Society were before in poſſeſſion of the ſix preceeding volumes.

MONS. L' ABBE' ROZIER.

Obſervations ſur la Phyſique &c. pour 1785.

Six numbers of the ſame work for 1786.

Memoire de M Demours, fils, Docteur Regent de la Faculte de Mèdecine de Paris.

Les Elans d'un Patriote.

MONS. GAUCHER.

Eſſai ſur L' obſervation du Coſtume National relativement aux Arts.

Diſcours en vers ſur la Societè.

THE HON. A. FRASER.

Certain Arrangements in Civil Policy neceſſary for the further improvement of Mines, Huſbandry, &c. Preſented by the Author.

MR. RICHARD SAMUEL

Mathematical Sleaing Tables, or the great and only myſtery of weaving Linen cloth, explained, &c.

Royal

ROYAL SOCIETY.

Three volumes of the Philoſophical Tranſactions, for the years 1783, 1784, and 1785.

MR. JOHN WILSON, of Mancheſter.

A Pamphlet entitled. An Eſſay on Light, and Colours, and what colouring matters are that dye Cotton and Linen. Preſented by the Author.

MR. FRANCIS VISPRE.

A Diſſertation on the growth of Wine in England. Preſented by the Author.

SOCIETY INSTITUTED AT BATH, FOR PROMOTING AGRICULTURE.

Letters and Papers on Agriculture, Planting, &c. ſelected from the correſpondence book of the Society inſtituted at Ba h,

Bath, for the encouragement of Agriculture, Arts, &c. volume 3d. 1786.

MR. RICHARD SAMUEL.

A Pamphlet entitled, Remarks on the utility of Painting and Drawing, dedicated to the Society. Prefented by the Author.

ARTHUR YOUNG. ESQ.

Annals of Agriculture, vol. IV and V. Prefented by the Author,

The Treaty of Navigation and Commerce, between his Britannick Majefty and the moft Chriftian King ſigned 26th. September 1786.

PICTURES AND PRINTS.

Mr. William Hincks.

A miniature Portrait of Mr. William Shipley, the founder of the Society, painted and preſented by Mr. William Hincks.

Of this Portrait, an Engraving was made, and preſented by the ſame Artiſt; a Print of which is affixed as the frontiſpiece to the fourth volume of theſe tranſactions.

Mr. Robert Laurie.

Several Drawings taken from the Machines, &c. in the Society's Repoſitory.

Mons.

MONS. GAUCHER, Engraver at Paris.

Five Prints. Le Prince Henry de Pruſſe—and Le Comte de Vergennes—Jean Francois Marmontel—Charles, M. I. B. du Paty,—and an emblematic Vignette.

MACHINES AND MODELS.

REV. JAMES COOKE.

A large working model of a Drill Plough, and a new conſtructed Hand Hoe, for which a patent has been granted. Preſented by the Rev. James Cooke the inventor, ſee an account of experiments made therewith, page 71.

A mo-

Mr. Bream, of Yarmouth.

A model of a Boiler, for the uſe of Tallow Chandlers, and other Manufacturers of inflamable matters.

Mr. William Shipley.

Several light Garden Tools. Theſe tools are deſigned for the uſe of young gentlemen and Ladies attentive to gardening, and are reſerved in the Society's Repoſitory, for the inſpection of the publick.

Mr. John Horne.

A Patent univerſal Sowing machine, for ſowing Broad Caſt, or drilling, fixed to a Kentiſh plough. Preſented by Mr, John Horne, the inventor.

A mo-

WILLIAM WALCOT, ESQ.

A model of an improved Harpoon, for killing Whales.

Mr. EDMUND LEACH.

A model of a Crane for Wharfs.

MISCELLANEOUS ARTICLES.

THOMAS BOOTHBY PARKYNS, ESQ.

A ſmall box of ſeed of the plant called Racine de Diſſette. See page 52.

Mr. COOKE.

A ſmall Gun Rammer with an improved Sponge.

Mr. PETER SIDEBOTHAM.

An Alarum to give notice in caſe of Fire or Thieves, preſented and fixed up in the Society's Houſe.

Mr. EDWARD JOHNSON.

A Fluſh Cheſt handle.

CHARLES GOWER, ESQ.

A ſubſtitute for a loaded Skewer to be uſed in roaſting meat.

Three boxes of Hemp Seed from China. Preſented by the Directors of the honourable Eaſt India Company, ſee page, 171.

A CATALOGUE

OF THE

MODELS AND MACHINES

Received since the Publication of the fourth Volume of the Society's Transactions, with the Numbers, as they are arranged, in the Class to which they belong.

AGRICULTURE. CLASS I.

LXVI. A Large working Model of a new invented Patent Drill Plough, presented by the Rev. James Cook, the inventor.

LXVII.

LXVII. A new invented Patent universal Sowing Machine, for Broad-Caſt or Drilling, preſented by Mr John Horne, the inventor.

LXVIII, to LXXIV. Several light Garden Tools, preſented by William Shipley, Eſq; the inventor. Theſe Tools are deſigned for the uſe of young gentlemen and ladies attentive to gardening, and are reſerved in the Society's Repoſitory, for the inſpection of the publick.

LXXV. A new invented Chaff Cutter, by Mr. James Pike, for which he had a bounty of twenty Guineas. See page 65.

CHEMISTRY. CLASS II.

IV. A model of a Turpentine Boiler, preſented by Mr. Bream, of Yarmouth.

MA-

MANUFACTURES. CLASS III.

XXIV. A Cap, of a new Manufacture, by Mr. Luke Green, for which he had a bounty of Five Guineas.

MECHANICKS. CLASS IV.

CI. A new invented Handle for the conveniency of ſtowing Cheſts, and large packing Caſes or Boxes, on board Ships, preſented by Mr. Edward Johnſon.

CII. A model of an improved hand Harpoon, for killing Whales, preſented by William Walcot, Eſq.

CIII. A Nail and Bolt drawer, by Mr. William Rich, for which he had a bounty of three Guineas.

CIV. An inſtrument for teaching blind perſons muſic, by Mr Griffiths James Cheeſe, for which he had a bounty, the Gold Medal. See page 125.

CV. A trigonometrical inſtrument for meaſuring Angles, &c: by Mr Matthew Hill, for which he had a bounty of five Guineas.

CVI. A ſmall improved Rammer and Sponge, for a Gun, preſented by Mr Cooke.

CVII A model of a Crane for Wharfs, preſented by Mr. Edmund Leach.

CVIII. A ſubſtitute for a loaded ſkewer to be uſed in roaſting meat, preſented by Charles Gower, Eſq.

A LIST

OF THE

OFFICERS OF THE SOCIETY;

And CHAIRMEN

OF THE SEVERAL

COMMITTEES.

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**Hugh Duke of Northumberland.

**George Duke of Montagu, K.G.F.R.S.

Ja-

**Jacob P. Earl of Radnor
**Hon. Charles Marſham, F. R. S.
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P. Sir William Dolben, Bart.
* Sir Watkin Lewes, Knt.

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Mr Samuel More.

ASSISTANT-SECRETARY.

Mr Richard Samuel.

REGISTER.

Mr George Cockings.

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CHAIRMEN OF THE SEVERAL COMMITTEES.

Elected March 22, 1787.

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Mr Wingfield.

CORRESPONDENCE AND PAPERS.

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Robert Dower, Esq.

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Caleb Whitefoord, Esq. F. R. S.
John Parish, Esq.

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Mr Alexander Small,
John Pratt, Esq.

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CHAIRMEN.

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Mr Charles Smith,
Mr John Baynes.

MECHANICKS.

Joſeph Hurlock, Eſq. F. R. S.
* Samuel Ewer, Eſq.

CHEMISTRY.

Mr Edward Kendrick,
Dr Jackſon.

COLONIES AND TRADE.

Mr John Samuel,
Edward Webſter, Eſq.

MISCELLANEOUS MATTERS.

Mr Joſeph Jacob,
Mr Abraham Hall.

PRE-

PREMIUMS

OFFERED BY THE

SOCIETY

FOR THE ENCOURAGEMENT OF

ARTS, MANUFACTURES

AND

COMMERCE,

IN THE YEAR,

MDCCLXXXVII.

PREMIUMS

OF THE

SOCIETY

FOR THE ENCOURAGEMENT OF

ARTS, MANUFACTURES

AND

COMMERCE,

IN THE YEAR

MDCCLXXVII.

TO THE

PUBLICK.

ADELPHI BUILDINGS, *April* 11, 1787.

THE chief objects of the attention of the Society for the Encouragement of Arts, Manufactures and Commerce, in the application of their Rewards, are Ingenuity in the ſeveral branches of the Polite and Liberal Arts; uſeful Diſcoveries and Improvements in AGRICULTURE, MANUFACTURES, MECHANICKS, and CHEMISTRY, or the laying open any ſuch to the Publick; and in general all ſuch uſeful Inventions, Diſcoveries, or Improvements (though not mentioned in the Book of Premiums) as may appear to have a tendency to the advantage of Trade and Commerce; the Society therefore, in purſuance of their plan, propoſe to beſtow the following Premiums:

Premiums

Premiums for Planting and Huſbandry.

1. ACORNS. For ſetting or ſowing the greateſt quantity of land, not leſs than ten acres, with acorns, between the firſt day of October, 1786, and the firſt of January, 1787; and for fencing and preſerving the ſame effectually, in order to raiſe timber; the gold medal.

2. For the ſecond greateſt quantity of land, not leſs than five acres, ſet or ſown with acorns, agreeably to the above conditions; the ſilver medal.

CERTIFICATES of the ſetting or ſowing agreeably to the above conditions; and that there are not fewer than one thouſand Plants on each acre, to be produced to the Society, on or before the firſt Tueſday in November 1787.

3. ACORNS. For ſowing or ſetting, between the firſt of October, 1787, and

and the first of April, 1788, the greatest quantity of strong land, not less than ten acres with acorns, and seeds or cuttings of other trees, and for the effectually fencing and preserving the same, in order to raise timber and underwood; the gold medal.

4. For the second greatest quantity of land, not less than five acres, sown or set agreeably to the above conditions; the silver medal.

CERTIFICATES of setting or sowing agreeably to the above conditions, and that there are not fewer than three hundred young Oaks on each acre, to be delivered to the Society, on or before the first Tuesday in November, 1788.

5, 6. The same premiums are extended one year further.

CER-

CERTIFICATES to be produced on or before the firſt Tueſday in November 1789.

The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in November 1790.

7. RAISING OAKS. To the perſon who ſhall raiſe the greateſt number of oaks, not fewer than five thouſand, either from young plants, or from acorns, in woods, parks, or foreſts, that have long been under timber, and effectually fence and preſerve the ſame, in order to ſecure a ſucceſſion of oak timber in this kingdom; the gold medal.

8. For the next greateſt quantity, not fewer than three thouſand; the ſilver medal.

CERTIFICATES and accounts to be produced on or before the firſt Tueſday in January, 1788.

9, 10. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1789.

11, 12. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1790.

13. CHESNUTS. For ſetting or ſowing the greateſt quantity of land, not leſs than ſix acres, with Spaniſh Cheſnuts, before the firſt day of May, 1787, and for effectually fencing and preſerving the ſame, in order to raiſe timber; the gold medal.

14. For the ſecond greateſt quantity, not leſs than four acres; the ſilver medal.

15. For the third greateſt quantity, not leſs than two acres; the ſilver medal.

CERTIFICATES of ſetting or ſowing agreeably to the above conditions (and that there are twelve hundred Spaniſh Cheſnut plants, at leaſt, on each acre) muſt be delivered to the Society on or before the firſt Tueſday in November, 1787.

16. CHESNUTS. For ſowing or ſetting between the firſt of October 1787, and the firſt of April 1788, the greateſt quantity of dry loamy land, not leſs than ſix acres, with a mixture of Spaniſh Cheſnuts and the ſeeds or cuttings of other trees adapted to ſuch ſoil, and for effectually fencing and preſerving the ſame, in order to raiſe timber; the gold medal.

17. For the ſecond greateſt, quantity not leſs than four acres; the ſilver medal.

CER-

CERTIFICATES of ſowing or ſetting agreeably to the above conditions, and that there are not fewer than three hundred Cheſnut plants on each acre, to be delivered to the Society, on or before the firſt Tueſday in November, 1788.

18, 19. The ſame premiums are extended one year further.

CERTIFICATES to be delivered on or before the firſt Tueſday in November 1789.

20, 21. The ſame premiums are extended ony ear further.

CERTIFICATES to be delivered on or before the firſt Tueſday in November 1790.

22. ELM. For planting the greateſt number of the Engliſh Elm, not leſs than eight thouſand, between the twenty-fourth

of June, 1786, and the twenty-fourth of June, 1787, and for the effectually fencing and preſerving the ſame, in order to raiſe timber; the gold medal.

23. For the ſecond greateſt number, not leſs than five thouſand; the ſilver medal.

24. For the third greateſt number, not leſs than four thouſand; the ſilver medal.

CERTIFICATES of having planted agreeably to the above conditions, and ſpecifying the diſtance of the trees, muſt be delivered to the Society, on or before the firſt Tueſday in November, 1787.

25, 26, 27. The ſame premiums are extended one year further.

CERTIFICATES to be delivered on or before the firſt Tueſday in November, 1788.

28.

28. LARCH. For planting out, from the twenty-fourth of June, 1786, to the twenty-fourth of June, 1787, at a diſtance not more than five feet, the greateſt number of Larch-trees, not leſs than five thouſand; the plants to be between two and four years old when planted out; and for effectually fencing and preſerving the ſame, in order to raiſe timber; the gold medal.

29. For the ſecond greateſt number, not leſs than three thouſand; the ſilver medal.

CERTIFICATES of planting according to the above conditions, to be delivered on or before the laſt Tueſday in November, 1787.

30, 31. The like premiums will be given on the ſame conditions, for planting out Larch trees, between the twenty-

fourth

fourth of June, 1787, and the twenty-fourth of June, 1788.

CERTIFICATES to be produced on or before the laſt Tueſday in November, 1788.

32. HUNTINGDON WILLOW. For the greateſt number of acres, not leſs than three, planted in the year 1787, with Huntingdon Willows; the number of cuttings to be at leaſt one thouſand on each acre, properly fenced and ſecured; the gold medal.

CERTIFICATES to be produced on or before the laſt Tueſday in December, 1787.

33. ALDER. For the greateſt number of acres, not leſs than ſix, planted in the year 1786, with Alders, to be at leaſt one

one thouſand on each acre, properly fenced and ſecured.

CERTIFICATES to be produced to the Society, on or before the laſt Tueſday in December, 1787, of the ſaid planting, and that the trees were then growing on the land; the gold medal.

34. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the laſt Tueſday in December, 1788.

35. UPLAND OR RED WILLOW. For the greateſt number of acres, not leſs than three, planted before the end of April, 1787, with Upland or Red Willow, properly fenced and ſecured, the number of plants on each acre to be at leaſt twelve hundred; the gold medal.

CERTIFICATES to be produded on or before the laſt Tueſday in April, 1788.

It is well known that this ſpecies of Willow thrives well on dry ſandy land.

36. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the laſt Tueſday in April, 1789.

37. ASH. For planting the greateſt number of acres not leſs than ſix, in the year 1786, with Aſh for timber; the plants to be at leaſt two years old, properly ſecured and fenced; the number of plants on each acre to be at leaſt twelve hundred; the gold medal.

38. For the next greateſt number of acres, not leſs than four; the ſilver medal.

CER-

CERTIFICATES to be delivered on or before the ſecond Tueſdayin December, 1787.

39, 40. The ſame premiums are extended one year further.

CERTIFICATES to be delivered on or before the ſecond Tueſday in December, 1788.

41. ASH. For ſowing or ſetting in the year 1788, the greateſt quantity of land, not leſs than ſix acres with Aſh for timber, intermixed with the ſeeds, cuttings or plants of ſuch other trees as are adapted to the ſoil; the gold medal.

*41. For the next greateſt quantity not leſs than four acres; the ſilver medal.

CER-

CERTIFICATES of the ſowing or ſetting agreeably to the above conditions, and that there are not fewer than one hundred Aſh plants on each acre; to be delivered to the Society on or before the laſt Tueſday in December 1789.

42. The ſame premium is extended one year further.

CERTIFICATES to be delivered on or before the laſt Tueſday in December, 1790.

43. MIXED TIMBER TREES. To the perſon who ſhall encloſe and plant, or ſow the greateſt number of acres, not leſs than ten, with the beſt ſorts of Foreſt Trees, for timber, between the firſt of October, 1784, and the firſt of May, 1786, and ſhall deliver to the Society an account of the methods uſed in making the plantations, and of the nature of the ſoil, toge-

her

ther with proper Certificates that the trees are then in a thriving condition on the land; the gold medal.

The Accounts and Certificates to be produced to the Society on or before the firſt Tueſday in November, 1788.

44. The ſame premium is extended one year further.

The Accounts and Certificates to be produced on or before the firſt Tueſday in November, 1789.

45. The ſame premium is extended one year further.

The Accounts and Certificates to be produced on or before the firſt Tueſday in November, 1790.

46.

46. MULBERRY CUTTINGS. For raiſing the greateſt number of white or black Mulberry Trees, for feeding Silk Worms, not leſs than three hundred, from cuttings in the year 1785, the gold medal.

CERTIFICATES of the raiſing and growth, with the manner of culture, and that the plants were growing in September, 1778, to be produced on or before the firſt Tueſday in November, 1788.

47. MULBERRY CUTTINGS. To the perſon who ſhall form in the year 1785, the largeſt plantation, not leſs than one acre of Mulberry Cuttings for the purpoſe of feeding Silk Worms; the gold medal.

CERTIFICATES of the quantity of land, and the method of culture; that the Mulberry

berry Plants are not more than three feet aſunder, and that they were growing in the month of Septemper, 1788, to be produced on or before the firſt Tueſday in December, 1788.

It is propoſed that this plantation be continually kept in a low ſtate, to the intent that the gathering the leaves may always be within the reach of women and children.

48. MULBERRY CUTTINGS OR TREES. For planting the greateſt number of white or black Mulberry Cuttings or Trees, not fewer than three hundred, in the year 1787, for the purpoſe of feeding Silk Worms; the gold medal.

49. For the ſecond greateſt quantity, not fewer than one hundred and fifty; the ſilver medal.

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CERTIFICATES of such planting, with the manner of culture, and that the trees were growing in the month of July, 1789, to be produced to the Society on or before the first Tuesday in November, 1789.

50. MULBERRY TREES IN HEDGE ROWS. To the person who shall plant in the year 1788, the greatest number, not fewer than one hundred layers of the black or white Mulberry, in Hedge Rows, at a distance not less than twelve feet from each other; ten pounds.

51. For the next greatest number not fewer than fifty; five pounds.

CERTIFICATES of the number of plants, and that the trees were then in a growing state, to be delivered to the Society, on or before the first Tuesday in October, 1789.

*** *The*

*** *The Candidates for planting all kinds of trees, are to certify, that the respective plantations are properly fenced and secured, and particularly to state the condition the plants were in at the time of signing such Certificates.*

Any information which the Candidates for the foregoing premiums may chuse to communicate, relative to the methods made use of in forming the plantations, or promoting the growth of the several trees, or any other observations that may have occurred on the subject, will be thankfully received.

52. TREES FOR USE WHEN EXPOSED TO THE WEATHER. To the person who shall send the most satisfactory account, verified by experiments, to determine which of the following trees is of the greatest utility for timber or poles,

poles, for uſe when expoſed to the weather: viz.

Larch,	Black-Poplar,
Aſh,	Spaniſh-Cheſnut,
Willow,	Alder,
Lombardy-Poplar,	Beech.

The gold medal.

The Accounts to be produced on or before the ſecond Tueſday in December, 1787.

53. The ſame premium is extended one year further.

The Accounts to be produced on or before the ſecond Tueſday in December, 1788.

54. PRESERVING ACORNS. To the perſon who ſhall produce to the Society

ciety the moſt effectual method of preventing Acorns when ſown or planted for timber, being injured by Mice: the gold medal.

The Accounts verified by actual experiments, with proper Certificates that the methods made uſe of have been fully ſufficient for the purpoſe, to be produced on or before the laſt Tueſday in November, 1787.

55. PRESERVING CHESNUTS, and SEEDS of other FOREST TREES. To the perſon who ſhall produce to the Society, the moſt effectual method of preventing Cheſnuts, and the ſeeds of other Foreſt Trees, when ſown or planted for Timber, being deſtroyed by Mice; the ſilver medal.

The Accounts verified by actual experiments, with proper Certificates that the methods made uſe of have been fully ſuf-

ficient for the purpoſe; to be produced on or before the laſt Tueſday in November, 1787.

56. PLANTING BOGGY OR MORASSY SOILS. For an account of the beſt ſet of experiments ſent by the planter, or his repreſentative, to aſcertain the comparative advantages of planting boggy or moraſſy ſoils, with White Poplar, Black Poplar, Lombardy Poplar, and Willow; the gold medal.

It is required that not leſs than half an acre be planted with each, and the plants to be not more than four feet aſunder.

It is alſo required that the plantation ſtand fourteen years, at the end of which, to be all cut down and meaſured, or accurately meaſured ſtanding; the Certificates of the meaſure and value, and that the whole is properly fenced and ſecured;

to

to be produced on or before the first Tuesday in January, 1792.

N. B. Any information relating to the state of the plantation, if sent to the Society, between the time of planting and claiming the premium, will be thankfully received.

57. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in January, 1793.

58. The same premium is extended one year further.

CERTIFICATES to be produced on or before the first Tuesday in January, 1794.

59. The same premium is extended to the year 1796.

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1797.

60. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in January, 1798.

61. ROOTS OF CORN. To the perſon who ſhall aſcertain from obſervation, and by experiment, the ſucceſſion of the different Roots of Corn (diſtinguiſhing the times when ſuch ſucceſſion of roots takes place) particularly thoſe which ſhoot out at or near the time the plants go into ear; ſhewing alſo from facts, the injury ariſing from the failure of thoſe particular roots, and the moſt effectual means of preventing ſuch misfortune; the gold medal.

To be produced on or before the firſt Tueſday in January, 1788.

N. B. This

N. B. This premium is extended to Scotland and Ireland.

62. COMPARATIVE CULTURE OF WHEAT. For the beſt ſet of experiments on not leſs than ſix acres of land, to aſcertain whether it is moſt advantageous to cultivate Wheat, by ſowing it in the common broad-caſt way, by drilling it in equi-diſtant rows, or by dibbling, hoeing the intervals; the gold medal.

It is required that the diſtance between the rows, may not exceed eleven inches, and that an account of the nature and condition of the land on which the experiments are made, together with an account of the produce of the Corn, be produced to the Society, on or before the firſt Tueſday in February, 1788.

63. COMPARATIVE CULTURE OF WHEAT. For the beſt ſet of experiments made on not leſs than eight acres, four of which to be ſown broad-caſt and four drilled, to aſcertain whether it is moſt advantageous to cultivate Wheat, by ſowing it in the common broad-caſt way, or by drilling it in equi-diſtant rows, hoeing the intervals; the gold medal.

It is required that an account of the nature and condition of the land on which the experiments are made, together with an account of the produce of the corn, be produced to the Society on or before the firſt Tueſday in February, 1788.

64. The ſame premium is extended one year further. The accounts to be produced to the Society on or before the firſt Tueſday in February, 1789.

65. COM-

65. COMPARATIVE CULTURE OF WHEAT. For the beſt ſet of experiments made on not leſs than eight acres of land, four of which to be ſown broad-caſt and four dibbled, to aſcertain whether it is moſt advantageous to cultivate Wheat, by ſowing it in the common broad-caſt way, or by dibbling it in equidiſtant rows, hoeing the intervals; the gold medal.

It is required that an account of the nature and condition of the land on which the experiments are made, together with an account of the produce of the corn, be produced to the Society on or before the firſt Tueſday in February, 1788.

66. The ſame premium is extended one year further. The accounts to be produced to the Society on or before the firſt Tueſday in February 1789.

67. BEANS AND WHEAT. To the perſon who ſhall plant or drill between the firſt of December, 1785, and the firſt of March, 1786, the greateſt quantity of land, not leſs than ten acres, with Beans, and ſhall ſow the ſame land with Wheat in the ſame year, 1786; ten guineas.

It is required that an account of the ſort and quantity of Beans, the time of planting or drilling, and of reaping or mowing them, the produce per acre threſhed, the application of the ſtraw, the expenſe of planting or drilling, hand or horſe-hoeing, the diſtance of rows and the quality of the ſoil, together with Certificates of the number of acres, and that the land was actually ſown with Wheat in the year 1786, to be produced on or before the firſt Tueſday in November, 1787.

N. B.

N. B. The Society have been informed that Beans may be drilled or planted ſo early as the month of December, from whence may be derived the advantage of an early harveſt, in which caſe, the ſtraw will be far more valuable than that from a later planting or drilling.

68. The ſame premium is extended one year further. The accounts to be produced on or before the firſt Tueſday in November, 1788.

69. TURNEPS. For the beſt account of experiments made on at leaſt ſix acres of land, to determine the comparative advantages of the drill, or broad-caſt method in the cultivation of Turneps; the gold medal.

The accounts to be delivered in, on or before the third Tueſday in April, 1788.

70. The

70. The ſame premium is extended one year further.

The accounts to be delivered on or before the third Tueſday in April, 1789.

71. GREEN VEGETABLE FOOD. For the beſt account confirmed by experiments, of the vegetable Food, (Cabbages and Turneps excepted) growing in the months of March and April, that will moſt encreaſe the milk in mares, cows, and ewes, at that ſeaſon; provided ſuch food can be cultivated at an expenſe that will admit of its being applied to the above purpoſes; the gold medal.

CERTIFICATES to be produced on or before the ſecond Tueſday in November, 1787.

72. The ſame premium is extended one year further.

CER-

CERTIFICATES to be produced on or before the ſecond Tueſday in November, 1788.

73. TURNEP-ROOTED CABBAGE. For raiſing and having duly cultivated Turnep-rooted Cabbage, in the year 1785, for the feeding cattle or ſheep on the greateſt number of acres, not leſs than ten, and giving an account of the ſoil, culture, time, and manner of feeding off, produce, and the effects on cattle or ſheep fed with it; ten guineas.

74. For the next greateſt number of acres, not leſs than five; five guineas.

CERTIFICATES of the quantity of Land, with the accounts, to be produced on or before the laſt Tueſday in October, 1787.

75. TURNEP-ROOTED CABBAGE. For raiſing, and having duly cultivated Turnep-

Turnep-rooted Cabbage, in the year 1786, for the feeding cattle or ſheep, on the greateſt number of acres, not leſs than ten, and giving an account of the ſoil, culture, time and manner of feeding off, produce, and the effects on cattle or ſheep fed with it; the gold medal.

76. For the next greateſt number of acres, not leſs than five; the ſilver medal.

CERTIFICATES of the quantity of land, with the accounts, to be produced on or before the laſt Tueſday in October, 1788.

77. POTATOES FOR FEEDING CATTLE AND SHEEP. To the perſon who ſhall in the year 1788, cultivate the greateſt quantity of land, not leſs than four acres, with potatoes, for the ſole purpoſe of feeding cattle and ſheep, the gold medal, or twenty guineas.

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CERTIFICATES with ſatisfactory accounts of the expenſe and manner of cultivating the potatoes, and the application of them to the above purpoſes, and the ſucceſs that has attended the uſe of them, to be delivered to the Society on or before the ſecond Tueſday in November, 1789.

N. B. Should any Gentleman have already cultivated Potatoes for the purpoſes mentioned in the above advertiſement; any information from him on the ſubject will be thankfully received by the Society.

78. CULTIVATING ROOTS AND HERBAGE FOR FEEDING SHEEP AND BLACK CATTLE. For the moſt ſatisfactory experiments made between Michaelmas, 1786, and the firſt of May, 1787, in order to aſcertain which of the following

following plants can be cultivated and houſed, or otherwiſe ſecured for winter fodder, to the greateſt advantage, viz.

Turnep-rooted Cabbage.	Carrots,
Turnep Cabbage,	Parſneps,
Turneps,	Potatoes.

The accounts to be produced on or before the firſt Tueſday in November, 1787; the gold medal.

It is required that the above roots be taken off the land by the laſt day of October, 1786; that a Crop of Wheat may be ſown in the ſame ground, and the particulars of the ſowing and planting, taking up, produce, preſerving, and application to the feeding Sheep and Black Cattle, be ſpecified. The comparative experiments muſt be made between two or more of any of the above mentioned plants, and not leſs than two acres be cultivated with each particular kind of plant.

N. B.

N.B. Great advantage will ariſe to the Farmer occupying land in the neighbourhood of extenſive commons, from the conveniency of keeping large flocks of ſheep, and herds of cattle, if the difficulty of ſupporting them through the winter was obviated by a due knowledge of this practice.

79. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in November, 1788.

80. STOCKS OF BEES. To the perſon who ſhall have in his poſſeſſion, being his own property, the greateſt number of Stocks of Bees, not fewer than thirty, and who ſhall in the moſt judicious manner provide for them plen-

ty

ty of ſuch vegetables as afford them honey and wax; the gold medal, or twenty pounds.

81. For the next greateſt number, not fewer than twenty ſtocks; the ſilver medal, or ten pounds.

Proper Certificates of the number of Stocks, and that they have been in the poſſeſſion of the Claimant during the preceding ſummer, together with a particular account of the vegetables provided for their ſuſtenance, and the manner in which they have been managed, to be produced to the Society on or before the firſt Tueſday in November, 1789.

82. CULTIVATING THE TRUE RHUBARB. For raiſing before the end of the year 1787, the greateſt number of plants, not leſs than three hundred, of

Rheum

Rheum Palmatum, or true Rhubarb; the gold medal.

83. For the next greateſt quantity, not leſs than two hundred plants; the ſilver medal.

CERTIFICATES of the number of plants, thatt hey ſtand at leaſt four feet aſunder, that they have been in a thriving ſtate during the preceding ſummer, with an account of the ſoil, culture, and aſpect, to be produced on or before the ſecond Tueſday in February, 1788.

84, 85. The ſame premiums are extended one year further.

CERTIFICATES to be produced on or before the ſecond Tueſday in February,

86. RHUBARB. For the greateſt quantity of Rhubarb of Britiſh growth, not leſs than twenty pounds weight, equal to ſuch as is commonly ſold in the ſhops, under the name of Turkey, or Ruſſia Rhubarb; five pounds of which to be produced as a ſample, with Certificates that the remainder is of equal goodneſs; and a particular account of the manner of culture and cure, on or before the firſt Tueſday in November, 1787; the gold medal.

87. For the next greateſt quantity, not leſs than ten pounds weight; the ſilver medal.

88, 89. The ſame premiums are extended one year further. The ſamples and Certificates to be produced on or before the firſt Tueſday in November, 1788.

90. AS-

90. ASCERTAINING THE COMPONENT PARTS OF ARABLE LAND. To the perſon who ſhall produce to the Society the moſt ſatisfactory ſet of experiments, to aſcertain the due proportion of the ſeveral component parts of Arable Land, in one or more counties in Great Britain, by an accurate analyſis of it, and who having made a like analyſis of ſome poor land, ſhall, by comparing the component parts of each, and thereby aſcertaining the deficiencies in the poor ſoil, improve a quantity of it, not leſs than two acres, by the addition of ſuch parts as the former experiments ſhall have diſcovered to be wanting therein, and therefore probably the cauſe of its ſterility; the gold medal.

It is required that the manurings, ploughings, and crops of the improved land, be the ſame after the improvement

as before, and that a minute account of the produce in each ſtate; of the weather, and of the various influencing circumſtances, together with the method made uſe of in analyſing the ſoils, be produced, with proper certificates, and the chymical reſults of the analyſis, which are to remain the property of the Society, on or before the laſt Tueſday in November, 1788.

It is expected that a quantity, not leſs than ſix pounds, of the rich, of the poor, and of the improved ſoils, be produced with the Certificates.

N. B. Among the methods or proceſſes made uſe of by Chymiſts, and called *dry* or *moiſt*, the latter only appears adapted to the aſcertaining the reſpective proportions of the component parts of Arable earth.—Dr. Shaw, in his Chymical Lectures.—Dr. Home, in his principles of

Agri-

Agriculture. — Dr. George Fordyce, in his Elements of Agriculture, and Sir Torben Bergman, in his *Diſſertation ſur les Terres geoponiques*, have treated of theſe ſubjects.

91. The ſame premium is extended one year further.

The accounts to be produced on or before the laſt Tueſday in November, 1789.

92. The ſame premium is extended one year further.

The accounts to be produced on or before the laſt Tueſday in November, 1790.

93. The ſame premium is extended one year further.

The accounts to be produced on or before the laſt Tueſday in November, 1791.

94. The ſame premium is extended one year further.

The accounts to be produced on or before the laſt Tueſday in November, 1792.

95. IMPROVING LAND LYING WASTE. For the beſt account of a method of improving any of the following ſoils, being land lying waſte or uncultivated, viz. Clay, Gravel, Sand, Chalk, Moor, or Peat-earth, and Bog; verified by experiments on not leſs than ten acres of land, to be produced on or before the ſecond Tueſday in December, 1787; the gold medal for each.

96. For

96. For the next in merit, the ſilver medal.

The Soil, manner of improvement, expenſe, and product, are required to be fully explained.

97, 98. The ſame premiums are extended one year further.

The accounts to be produced on or before the ſecond Tueſday in December, 1788.

99, 100. The ſame premiums are extended one year further.

The accounts to be produced on or before the ſecond Tueſday in December, 1789.

101. MANURES To the perſon who ſhall give the moſt ſatisfactory account, verified by accurate experiments, on what

ſoil the application of Marl, Chalk Lime, or Clay ſeverally, as manures, be moſt beneficial; the gold medal.

It is required that each experiment be made on one acre, and that they be continued four years, the ſame kind of Grain being ſown the ſame year on the ſeveral ſpots.

It is alſo required, that if different manures are compared, the experiments be made on ſimilar ſoils, lying near each other.

An account of the nature of the ſoil, manure and the quantity laid on, with all expenſes and crops to be delivered, with ſpecimens of the ſoil and manure, on or before the firſt Tueſday in January, 1788.

102. The ſame premium is extended one year further.

The

The accounts and ſpecimens to be produced on or before the firſt Tueſday in January, 1789.

103. The ſame premium is extended one year further.

The accounts and ſpecimens to be produced on or before the firſt Tueſday in January, 1790.

104. MANURES. For the moſt ſatisfactory ſet of experiments, to aſcertain the comparative advantage of the following Manures, uſed as Top-Dreſſings, on Graſs or Corn Land, viz. Soot, Coal-Aſhes, Wood-Aſhes, Lime, Night-Soil; the gold medal.

It is required that not leſs than half an acre of land be appropriated to each Manure, the ſoils ſimilar, and lying near each other, and if the Manure be uſed on

Corn

Corn Land, then it is required that the ſame kind of grain be ſown the ſame year on each ſpot; the experiments to be continued not leſs than two years.

An account of the nature of the Soil, quantity, and expenſe of the Manure and Crops, with Certificates to be produced on or before the firſt Tueſday in December, 1787.

105. The ſame premium is extended one year further.

The account and Certificates to be produced on or before the firſt Tueſday in December, 1788.

106. COURSE OF CROPS ON STRONG LAND. For the moſt ſatisfactory account, verified by experiments, made on not leſs than five acres of Clay, or wet Loam, to aſcertain the advantages of the following courſe of crops, viz.

Firſt,

First, Beans drilled, or planted and hoed: Secondly, Wheat; the gold medal.

These experiments to be continued two courses, or four years.

CERTIFICATES with an account of the Soil, Culture, and quantity of Manure, if any, laid on, to be produced on or before the last Tuesday in March, 1788.

N. B. The success of this course of crops, much depending on the land being kept entirely clean, it is expected that each crop of the Beans be horse-hoed or hand-hoed, at least three times.

107. IMPROVING WASTE MOORS. For the improvement of the greatest number of acres of Waste Moor Land, not less than one hundred; the gold medal.

It is required that the land before improvement, be absolutely uncultivated,

in

in a great meaſure uſeleſs, not let to any tenant, and without any building upon it except cottages or huts. That in its improved ſtate, it ſhall be encloſed, cultivated, and divided into fields, with buildings erected thereon, ſufficient for the uſe and reſidence of a tenant.

CERTIFICATES of the number of acres, of the quality of the Moor ſo improved, of the mode and expenſe of the improvement: the ſtate it is in as to the proportion of graſs to arable; and the rent at which it is let; to be produced on or before the firſt Tueſday in February, 1788.

108. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in February 1789.

109.

109. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in February, 1790.

110. GAINING LAND FROM THE SEA. To the perſon who ſhall produce to the Society, an account of the beſt method, verified by actual experiment, of gaining Land from the Sea, not leſs than twenty acres, on the coaſt of England or Wales; the gold medal.

CERTIFICATES of the quantity of Land, and that the experiments were begun after the firſt of January, 1782, to be produced to the Society on or before the firſt Tueſday in October, 1787.

N. B. The Society have been credibly informed, that land has been gained on the coaſt

coaſt of Holland, by fixing rows of whiſps of ſtraw upright in the ſand, at about a foot diſtant from each other, or by fixing ſtakes at proper diſtances from each other and whatling ſtraw bands between them.

111. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in October 1788.

112. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in October, 1789.

113. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in October, 1790.

114. The

114. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in October, 1791.

115. MACHINE TO ANSWER THE PURPOSE OF REAPING OR MOWING CORN. For inventing a Machine to anſwer the purpoſe of mowing or reaping Wheat, Rye, Barley, Oats, or Beans, by which it may be done more expeditiouſly and cheaper, than by any method now practiſed, provided it does not ſhed the Corn or Pulſe, more than the methods in common practice, and that it lays the ſtraw in ſuch manner as may be eaſily gathered up for binding; ten guineas.

The Machine with Certificates that at leaſt three acres have been cut by it, to be

be produced to the Society on or before the ſecond Tueſday in December, 1787.

Simplicity and cheapneſs in the conſtruction, will be conſidered as principal parts of its merit.

116. CURING SCAB IN SHEEP. To the perſon who ſhall diſcover to the Society the moſt efficacious method of curing the diſorder called the *Scab in Sheep*, verified by repeated trials; the ſilver medal, or ten guineas.

CERTIFICATES of different cures with a deſcription of the diſeaſe, and a particular account of the method or recipe, and the manner of uſing it, to be delivered to the Society, on or before the ſecond Tueſday in January, 1788.

117. DESTROYING THE GRUB OF THE COCKCHAFER. To the perſon

perſon who ſhall diſcover to the Society an effectual method, verified by repeated and ſatisfactory trials, of deſtroying the Grub of the Cockchafer, ſo deſtructive to the roots of all ſorts of Corn, Peas, Beans, and Turneps; the gold medal.

The Accounts to be produced on or before the firſt Tueſday in January, 1788.

Premiums for Diſcoveries and Improvements in Chemiſtry, Dyeing and Mineralogy.

118. KELP. For the greateſt quantity, not leſs than four tons of Kelp, containing a much larger proportion of Alkaline Salt than any Kelp now made for ſale; twenty pounds.

A ſpecimen of one hundred weight, to be produced on or before the firſt Tueſday in January, 1788; together with Certificates that the whole quantity is equal to the ſpecimen, and made in Great-Britain or Ireland, of Sea Weed.

119. BARILLA. For the greateſt quantity of merchantable Barilla, not leſs than half a Ton, made from Spaniſh Kali, raiſed in Great-Britain; the gold medal.

A ſample of not leſs than twenty-eight pounds, with a Certificate that half a ton has

has been made; to be produced on or before the firſt Tueſday in January, 1788.

120. DISSERTATION ON ALKALI. To the perſon who ſhall compoſe the beſt diſſertation on the nature and qualities of vegetable and mineral Alkali, containing an account of their analogy to each other, and of the moſt eſſential properties wherein they differ; together with any uſeful remarks that may have eſcaped the notice of chemical Writers, explaining alſo the means of ſeperating them from each other, but more particularly from ſea ſalt, or other neutral ſalts which are frequently found united with them; ſo that when purified, they may be advantageouſly uſed in ſuch manufactures wherein the admixture of neutral ſalts is detrimenal: Laſtly, an inveſtigation into the nature of their compoſition and the method of decompounding them into

their conſtituent principles; the gold medal, or fifty pounds.

The diſſertation to be produced to the Society on or before the firſt Tueſday in March, 1788.

121. PRESERVING SEEDS OF VEGETABLES. For the beſt method of preſerving the ſeeds of plants in a ſtate fit for vegetation, a longer time than has hitherto been practiſed, ſuch method being ſuperior to any known to the publick, and verified by ſufficient trial; to be communicated to the Society on or before the firſt Tueſday in December, 1787; the gold medal.

122. DESTROYING SMOKE. For the beſt account, aſcertained by proper experiments, of a method of deſtroying or burning the ſmoke of fires belonging

to

to ſteam Engines, Furnaces employed in calcining or ſmelting metals, or other large works, in order to prevent annoyance to the neighbourhood; to be produced on or before the firſt Tueſday in January, 1788; the gold medal.

123. CANDLES FROM RESIN. To the perſon who ſhall diſcover to the Society, the beſt method of ſo reducing the inflamable quality of Reſin, as to adapt it to the purpoſes of making Candles fit for common uſe, at a price much inferior to that of Candles made of Tallow only; the gold medal, or thirty guineas.

Six pounds at leaſt of the Candles ſo prepared, with an account of the proceſs, to be delivered to the Society on or before the firſt Tueſday in December, 1787.

124. SUBSTITUTE FOR OR PREPARATION OF YEAST. For diſcovering to the Society an effectual Subſtitute for Yeaſt, or preparation of Yeaſt, which after being kept two months, ſhall be fit for fermenting liquors, and raiſing bread; the gold medal, or twenty pounds.

Specimens of the Subſtitute, or of the preparation of Yeaſt, ſufficient for trials, together with a paper ſealed up, and containing an account of the compoſition of the Subſtitute, or method of preparing the Yeaſt, to be produced on or before the laſt Tueſday in November, 1787.

125. INCREASING STEAM. To any perſon who ſhall diſcover to the Society, a method verified by actual experiments, of increaſing the quantity, or the force of Steam, in Steam Engines, with leſs fuel than is uſually employed, provided that in general the whole amount

of

of the expenſes in uſing Steam Engines may be conſiderably leſſened; the gold medal.

To be communicated to the Society on or before the firſt Tueſday in January, 1788.

N. B. As it is well known there are methods of preventing the ebullition of liquids, by the addition of particular matters in the boiling, it is ſubmitted to the conſideration of the ingenious, whether by the addition of ſome matters, or by ſome mechanical operations, the boiling and evaporation may not be increaſed.

126. The ſame premium is extended one year further.

To be communicated to the Society on or before the firſt Tueſday in January, 1789.

127. METHOD OF COMPARING SWEETS. To the perſon who ſhall diſcover to the Society an Index or practical method of comparing, meaſuring and aſcertaining the degrees of ſweetneſs in ſaccharine ſubſtances; the gold medal.

To be produced on or before the firſt Tueſday in January, 1788.

128. PREVENTING THE DRY ROT IN TIMBER. To the perſon who ſhall diſcover to the Society, the cauſe of the Dry Rot in Timber, and diſcloſe a certain method of prevention, ſuperior to any hitherto known; the gold medal.

The accounts of the cauſe and method of prevention, confirmed by repeated experiments, to be produced to the Society on or before the ſecond Tueſday in December, 1787.

129. The

129. The ſame premium is extended one year further.

The accounts to be produced on or before the ſecond Tueſday in December, 1788.

130. BRONZE FOR COPPER MEDALS. To the perſon who ſhall diſcover to the Society a method of bronzing Copper Medals, equal to that practiſed in France; the gold medal.

To be produced to the Society on or before the ſecond Tueſday in December, 1787.

131. FINE BAR IRON. To the perſon, in England, or Wales, who ſhall make in the year, 1788, the greateſt quantity of bar Iron, not leſs than ten tons, with Coak from Coak Pigs, equal in quality to the beſt Iron imported from Sweden

Sweden or Ruſſia, and as fit for converting into Steel; the gold medal.

Samples, not leſs than one hundred weight, with Certificates that the whole quantity is of equal quality, to be produced to the Society on or before the firſt Tueſday in January, 1789.

Premiums

Premiums for promoting the Polite Arts.

132. HONORARY PREMIUMS FOR DRAWINGS. For the beſt drawing of any kind, made with crayons, chalk, black lead, pen, Indian ink, or biſter, by young gentlemen under the age of twenty-one, ſons or grandſons of Peers or Peereſſes, in their own right, of Great-Britain or Ireland; to be produced on or before the firſt Tueſday in March, 1788; the honorary medal of the Society in gold.

133. The ſame in ſilver, for the ſecond in merit.

134, 135. The ſame premiums will be given on the like conditions, to young ladies, daughters or grand daughters of Peers or Peereſſes, in their own right, of Great-Britain or Ireland.

136. HO-

136. HONORARY PREMIUMS FOR DRAWINGS. For the beſt drawings of any kind made with crayons, chalk, black lead, pen, Indian ink, or biſter; by young gentlemen under the age of twenty-one.

To be produced on or before the firſt Tueſday in March, 1788; the gold medal.

137. For the next in merit; the ſilver medal.

138, 139. The ſame premiums will be given for drawings by young ladies.

N. B. Perſons profeſſing any branch of the Polite Arts, or any buſineſs dependant on the arts of deſign, or the ſons or daughters of ſuch perſons, will not be admitted candidates in theſe claſſes.

The

The folloming premium is offered in conformity to the Will of the late John Stock, of Hampſtead, Eſq.

140. SCULPTURE. For the beſt model of the buſt of his Royal Highneſs the Prince of Wales, as large as the life; to be produced on or before the third Tueſday in November, 1787; a ſilver medallion, with the following engraved inſcription: *The premium given by the Society for the Encouragement of Arts, Manufactures and Commerce, in conformity to the Will of John Stock, of Hampſtead, Eſq.*

A caſt from the model to which the premium is adjudged is to remain the property of the Society.

141. DRAWINGS OF OUTLINES. For the beſt Outline after an original group or caſt in plaſter of human figures, by

by perſons of either ſex under the age of ſixteen, the principal figure not leſs than twelve inches; to be produced on or before the laſt Tueſday in November, 1787; the greater ſilver pallet.

142. For the next in merit; the leſſer ſilver pallet.

N. B. Theſe drawings are to be made on paper with chalk, black lead, Indian ink, or biſter; and the originals either to be produced to the Society or to be referred to for their examination.

143. DRAWINGS OF MACHINES. For the beſt perſpective drawing, by perſons of either ſex, under the age of twenty-one years, of the model of a Crane, by Mr Bunce, in the Society's Repoſitory, ſhewing particularly the method of ſtopping the wheel by the centrifugal force of the ball, the greater ſilver pallet; to be

be produced on or before the third Tuesday in November, 1787.

N. B. Such candidates as propose to make drawings for this premium, will be admitted by the Register any day (Sundays or Wednesdays excepted) between the hours of ten and two.

The drawing to which the premium is adjudged, is to remain the property of the Society.

144. DRAWINGS OF LANDSCAPES. For the best drawing of Landscapes after nature, by persons of either sex under twenty-one years of age, to be produced on or before the third Tuesday in November, 1787; the greater silver pallet.

145. For the next in merit; the lesser silver pallet.

Each

Each candidate muſt mention, on the front of his drawing, from whence he took his view; and the drawings muſt be made with chalk, pen, Indian ink, or biſter.

146. HISTORICAL DRAWINGS. For the beſt Hiſtorical Drawing, being an original compoſition of five or more human figures; the height of the principal figure not leſs than eight inches. To be made with crayons, chalk, black lead, pen, Indian ink, or biſter, and to be produced on or before the third Tueſday in November, 1787; the gold pallet.

147. For the next in merit; the greater ſilver pallet.

148. ENGRAVING IN THE LINE MANNER. To the Engraver who ſhall produce to the Society, the beſt engraved Plate executed by himſelf of the dimenſions

ſionsof not leſs than twenty inches by ſixteen inches, containing not fewer than three human figures, the principal figure not leſs than twelve inches high; to be engraved in the *Line Manner*, from any old or modern picture, the plate to be publiſhed by the Engraver.

The regular progreſs of the work from the firſt proof of the etching, to the finiſhed impreſſion of the Plate, to be produced to the Society on or before the firſt Tueſday in February, 1789; the gold pallet. and twenty-five guineas.

149. The ſame premium is extended one year further.

The impreſſions to be delivered on or before the firſt Tueſday in February, 1790.

150. SURVEYS OF COUNTIES.

To the perſon who in the year 1791, ſhall

compleat and publiſh an accurate ſurvey of any one County in England or Wales, on a ſcale of not leſs than one inch to a mile, for which rewards have not already been given by the Society; the gold medal or fifty pounds.

CERTIFICATES of the accuracy of the ſurvey, and that it was begun after the firſt of June, 1787, together with the Map, to be produced on or before the laſt Tueſday in January, 1792.

The Map to which the premium ſhall be adjudged to remain the property of the Society.

N. B. The Society are already in poſſeſſion of Surveys of the following Counties, viz. Devonſhire, Derbyſhire, Somerſetſhire, Northumberland, Suffolk, Leiceſterſhire, Cumberland, and Lancaſhire.

CON-

CONDITIONS.

No perſon who has gained the firſt premium in any claſs, will be admitted a candidate in a claſs of an inferior age; and no candidate ſhall receive more than one premium in one year; nor will they, who for two ſucceſſive years, ſhall gain the firſt premium in one claſs, be ever again admitted as candidates in that claſs.

No perſon ſhall ever be admitted a candidate in any claſs, in which he has three times obtained the whole of the firſt premium.

No candidate ſhall ſend in more than one performance in any one claſs.

All the claims which are produced each year, before the Committee of Polite Arts (to which premiums or bounties are adjudged) are to remain with the Society ſix weeks after the determination, unleſs

the candidates, for particular reaſons, do apply to have the performances returned.

No claim for a premium in the polite Arts will be admitted, that has obtained, or has been produced in order to obtain a premium, reward or gratification from any other Society, or any academy or ſchool.

All performances that obtain premiums in the Polite Arts, muſt be begun after the publication of ſuch premiums.

Purpoſely to encourage real merit, and to prevent any attempts to impoſe on the Society, by producing drawings which ſhall have been made or retouched by any other perſon than the candidate, the Society is reſolved upon all occaſions, with reſpect to the ſucceſsful candidates in claſſes 141 to 146 incluſive, to prove their abilities, by requiring a ſpecimen made under the inſpection of the committee of Polite Arts, in every inſtance where ſuch proof can be obtained.

Premiums

Premiums for encouraging and improving Manufactures.

151. SILK. For the greateſt quantity of merchantable Silk, not leſs than five pounds, produced by any one perſon in England, in the year 1787; the gold medal.

Specimens of the Silk, not leſs than one pound, with Certificates that the whole is of equal quality, and produced in England; to be delivered to the Society on or before the firſt Tueſday in January, 1788.

152. For the ſecond greateſt quantity, not leſs than two pounds; the ſilver medal.

153. MACHINE FOR CARDING SILK. For the beſt machine, ſuperior

to any now in uſe, for carding waſte Silk equally well as by hand; to be produced together with a ſpecimen of the Cardings, on or before the firſt Tueſday in November, 1787; the gold medal, or twenty pounds.

154. WEAVING FISHING NETS. For the beſt ſpecimen of plain netting, for Fiſhing Nets, not leſs than twenty yards long, and ſix feet deep, woven in a loom, or other machine; to be produced to the Society on or before the ſecond Tueſday in January, 1788; twenty guineas.

N. B. It is expected that the ſpecimen produced, be made in ſuch a manner, as to be cut and joined without more loſs than uſual, that it have ſuch a plain ſelvage as the common fiſhing nets, and that the knot be equally faſt with thoſe

in

in nets in common uſe, and as eaſily repaired.

155. PAPER FOR COPPER PLATES. To the perſon who ſhall eſtabliſh in England or Wales, a manufacture of Paper, ſuperior to any hitherto made, proper for receiving impreſſions from Mezzotinto, and other engraved Copper-plates, and produce to the Society, one ream of the dimenſions of *French Colombier*, on or before the firſt Tueſday in November, 1787; the gold medal.

CERTIFICATES muſt be produced to the ſatisfaction of the Society, that the Paper was made in England or Wales.

156. A ſtrong CLOTH being prepared in SWEDEN, from HOP STALKS, or BINDS, the Society will give the gold medal, or twenty pounds, as a premium for the beſt and greateſt quantity of ſuch

Cloth, not leſs than twenty-five yards, made in England, and produced to the Society, on or before the ſecond Tueſday in December, 1787.

One pound at leaſt of the Thread to be produced with the claim.

157. The ſame premium is extended one year further.

The Cloth and Thread to be produced to the Society on or before the ſecond Tueſday in December, 1788.

158. The ſame premium is extended one year further.

The Cloth and Thread to be produced to the Society on or before the ſecond Tueſday in December, 1789.

159. PAPER FROM VEGETABLE SUBSTANCES NOT PREVIOUSLY MADE INTO

INTO CLOTH. To the perſon in England or Wales, who ſhall make the greateſt quantity, not leſs than ten reams of the beſt and moſt uſeful paper, from vegetable ſubſtances that have not been previouſly made into cloth; ten guineas.

CERTIFICATES of the making ſuch paper, and one ream of the paper to be produced on or before the firſt Tueſday in November, 1788.

N. B. The Society are in poſſeſſion of two volumes, containing a great variety of ſpecimens of paper made from raw vegetables, viz. Thiſtles, Potatoe-Haum, Poplar, Hop Binds, &c. which volumes may be inſpected by any perſon on application to the Regiſter.

Premiums

Premiums for Inventions in Mechanicks.

159. TRANSIT INSTRUMENT. To the perſon who ſhall invent and produce to the Society, a cheap and portable Tranſit inſtrument, which may eaſily be converted into a Zenith Sector, capable of being accurately and expeditiouſly adjuſted for the purpoſes of finding the latitudes and longitudes of places, and ſuperior to any portable Tranſit inſtrument now in uſe; the gold medal, or twenty guineas.

To be produced on or before the laſt Tueſday in January, 1788.

160. GUN HARPOON. For every Whale taken by means of the Gun Harpoon; to the perſon who firſt ſtrikes ſuch fiſh therewith; two guineas.

N. B. Proper Certificates of the taking ſuch Whales, in the year 1787, ſigned by

by the maſter or by the mate, when the claim is made by the maſter; to be delivered to the Society on or before the laſt Tueſday in December, 1787.

161. GUN FOR THROWING HARPOONS. To the perſon who ſhall produce to the Society, the beſt improvement in the conſtruction of a gun for throwing Harpoons, ſo as to render it more manageable than thoſe at preſent in uſe; the ſilver medal, or ten guineas.

The Gun to be produced to the Society on or before the firſt Tueſday in December, 1787.

162. HARPOON TO BE THROWN BY A GUN. To the perſon who ſhall produce to the Society, the beſt improvement in the conſtruction of a Harpoon to be thrown by a gun; the Harpoon to be

be ſo contrived, that it may ſtrike and hold the fiſh with more certainty and greater effect than any hitherto made uſe of; the ſilver medal, or ten guineas.

The Harpoon to be produced to the Society on or before the firſt Tueſday in December, 1787.

163. CROSS BOW, OR OTHER INSTRUMENT FOR THROWING HARPOONS. To the perſon who ſhall produce to the Society, the beſt conſtructed Croſs Bow, or other Inſtrument to be uſed in the whale fiſhery for throwing Harpoons, with more advantage and greater effect than the gun, or any other inſtrument now in uſe; the ſilver medal, or ten guineas.

To be delivered to the Society on or before the firſt Tueſday in December, 1787.

164. CROSS

164. CROSS BOW HARPOON. For every Whale taken by means of a Harpoon, ſhot from a Croſs Bow; to the perſon who firſt ſtrikes ſuch fiſh therewith, two guineas.

Proper Certificates of the taking ſuch whales in the year 1787, ſigned by the maſter, or by the mate, when the claim is made by the maſter; to be delivered to the Society on or before the laſt Tueſday in December, 1787.

165. MACHINE FOR TRANSPORTING TIMBER. To the perſon who ſhall produce to the Society a model of the beſt, moſt ſimple, and cheap Machine or carriage for tranſporting Timber, or other heavy Materials; on ſoft or clayey roads, at the leaſt expenſe; to be ſent in or before the laſt Tueſday in November, 1787; twenty guineas.

166. IM-

166. IMPROVEMENT OF THE HAND VENTILATOR. To the perſon who ſhall produce to the Society, on or before the laſt Tueſday in February, 1788, a portable Ventilator, to be worked by hand, better adapted and more efficacious for extracting foul air from goals, priſons and ſhips, than any now known or in uſe; the gold medal, or twenty guineas.

167. CRANES FOR WHARFS. To the perſon who ſhall invent and produce to the Society, a model of a Crane for Wharfs, on a ſcale of not leſs than one inch to a foot, the conſtruction to be ſuch, that the effect of the power may be varied according to the weight, to be raiſed, in a manner different from any now known or in uſe, yet more ſimple and effectual; the gold medal; or twenty guineas.

To

To be produced on or before the firſt Tueſday in February, 1788.

N. B. The model ſhould neither be of the walking wheel nor capſtan kind.

Although it is well known that the effect of the wind on horizontal Sails is greatly inferior to that on thoſe which move in a vertical direction, yet as there are ſome circumſtances and ſituations where it would be moſt convenient to erect an horizontal Mill, the Society do therefore offer the following premium.

168. HORIZONTAL WINDMILL. To the perſon who ſhall invent and produce to the Society, a model of an horizonal Windmill on a Scale of not leſs than one inch to a foot, ſuperior to thoſe already in uſe; the gold medal, or twenty guineas.

To

To be delivered to the Society, on or before the firſt Tueſday in February, 1788.

169. HAND MILL. To the perſon who ſhall produce to the Society a better conſtructed Hand Mill, for general purpoſes than any now known or in uſe; the ſilver medal, or ten guineas.

To be delivered to the Society on before the laſt Tueſday in December, 1787.

170. MACHINE FOR RAISING COALS, ORE, &c. &c. To the perſon who ſhall invent a machine for raiſing Coals, Ore, &c. from mines which ſhall produce the effect at a leſs expenſe than thoſe already known or in uſe; the gold medal, or twenty guineas.

A model of the machine made on a ſcale of not leſs than one inch to a foot; to be produced to the Society on or before the ſecond Tueſday in February, 1788.

171. SLUICES

171. SLUICES FOR SCOWERING CHANNELS. To the perſon who ſhall invent and produce to the Society, a model of a Sluice or Water Gate, conſtructed in ſuch a manner as to be with eaſe and expedition, ſo diſpoſed as to ſcour a Channel, increaſing in width equal at leaſt to an angle of forty-five degrees; twenty guineas.

To be produced on or before the ſecond Tueſday in February, 1788.

172. MACHINE FOR CLEARING RIVERS. For the beſt model of a machine ſuperior to any now in uſe, for clearing Navigable Rivers from Weeds, at the leaſt expenſe; ten guineas.

To be produced to the Society on or before the firſt Tueſday in February, 1788.

173. SECURING BUILDINGS FROM FIRE. To the perſon who ſhall produce to the Society, an effectual method of preventing accidental Fires in houſes or other buildings; twenty guineas.

To be produced on or before the ſecond Tueſday in February, 1788.

Premiums

Premiums offered for the Advantage of the Britiſh Colonies.

173. NUTMEGS. For the greateſt quantity of merchantable nutmegs, not leſs than five pounds weight, being the growth of his majeſty's dominions in the Weſt Indies, and equal to thoſe imported from the iſlands of the Eaſt Indies; the gold medal; or one hundred pounds.

Satisfactory Certificates from the governor, lieutenant-governor, preſident of the council, or ſpeaker of the houſe of aſſembly, of the place of growth, with an account of the number of trees, their age, nearly the quantity of fruit on each tree, and the manner of culture, to be produced on or before the firſt Tueſday in December, 1788.

174. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the ſecond Tueſday in December, 1789.

N. B. Any perſon deſirous of information on the ſubject of Nutmeg Trees, may obtain it from a memorial on the fructification of the Nutmeg, and the ſureſt method of cultivating it to advantage; by the King's Gardener, at the Iſle of Bourbon, inſerted in Mr. Maty's Review, for Auguſt, 1783.

175, 176. BREAD FRUIT TREE. To the perſon or perſons who, between the firſt of June, and the fifteenth of Auguſt, 1787, ſhall bring into the port of London the greateſt number of plants of one or both ſpecies of the Bread Fruit Tree, in a growing ſtate, not leſs than three of either ſpecies; the gold medal.

177, 178.

177, 178. The ſame premiums are extended one year further; the plants to be brought into the port of London, between the firſt of June, and the fifteenth of Auguſt, 1788.

N: B. The plants which obtain the premiums are to be the property of the Society, to be diſpoſed of according to their diſcretion.

THE SOCIETY being informed that a conſiderable quantity of oil can be obtained from the ſeed of Cotton, and that after the expreſſion of the oil, the remaining cake will afford a ſtrong and hearty food for cattle; and likewiſe, that the apparatus for the operation can be applied to the mill for ſugar canes, and worked in the rainy ſeaſon, at a moderate expenſe, have reſolved, for the foregoing reaſons, that the procuring oil from the ſeed of Cotton, is a proper object of

a premium, conſidered as an encouragement for planters to extend the cultivation of Cotton, an article eſſentially requiſite to encreaſe the manufacture of that commodity in this country.

The Society therefore offer as follows:

179. OIL FROM COTTON SEED. To the planter in any of the Britiſh Iſlands of the Weſt Indies, who ſhall expreſs oil from the ſeed of Cotton, and make from the remaining ſeed, hard and dry cakes, as food for cattle; the gold medal.

CERTIFICATES that not leſs than one ton of the oil has been expreſſed, and five hundred weight of the cakes obtained, to be produced to the Society, with two gallons of the oil, and two dozen of the cakes, together with a full account of

of the proceſs, on or before the laſt Tueſday in November, 1787.

180. For the next greateſt quantity not leſs than half a ton of oil, and two hundred weight of the cakes; the ſilver medal.

181, 182. The ſame premiums are extended one year further.

CERTIFICATES and ſamples, to be produced on or before the laſt Tueſday in November, 1788.

183. SPIRIT FROM THE PULP OF THE COFFEE BERRY. To the Planter in any of the Britiſh Iſlands in the Weſt Indies, who ſhall diſtil the greateſt quantity of Spirit, from the Pulp of the Coffee Berry, not leſs than thirty gallons, and produce to the Society one gallon of the Spirit, together with an ac-

count of the proceſs uſed in the making it; the gold medal.

184. For the next greateſt quantity not leſs than fifteen gallons; the ſilver medal.

CERTIFICATES ſigned by the governor, lieutenant-governor, or ſome perſons of known credit in the iſland, to be delivered to the Society, on or before the firſt Tueſday in January, 1788.

185. SENNA. To the perſon who ſhall import into the port of London, in the year 1787, the greateſt quantity of Senna, not leſs than two hundred weight, the growth of any of the Britiſh Iſlands in the Weſt Indies, and equal to the *Alexandrian Senna*, now uſed for medicinal purpoſes; the gold medal.

CERTIFICATES of the growth and method of culture, to be produced to the Society,

Society, on or before the firſt Tueſday in February, 1788.

186. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in February, 1789.

187. The ſame premium is extended one year further.

CERTIFICATES to be produced on or before the firſt Tueſday in February, 1790.

188. KALI FOR BARILLA. To the perſon who ſhall cultivate in the Bahama Iſlands, or any other part of his Majeſty's Dominions in the Weſt Indies, in the year 1788, the greateſt quantity of land, not leſs than five acres, with Spaniſh Kali, fit for the purpoſe of making Barilla; the gold medal.

189. For

189. For the next greateſt quantity, not leſs than three acres; the ſilver medal.

CERTIFICATES ſigned by the governor, lieutenant-governor, or other chief magiſtrate, of the quantity of land ſo cultivated, and of the ſtate of the plants at the time of ſigning ſuch Certificates, to be delivered to the Society on or before the ſecond Tueſday in November, 1789.

190. The ſame premium is extended one year further.

CERTIFICATES to be delivered on or before the ſecond Tueſday in November, 1790.

Society's

Society's Office, Adelphi, May 24, 1787.

Ordered,

THAT THE SEVERAL CANDIDATES AND CLAIMANTS TO WHOM THE SOCIETY SHALL ADJUDGE PREMIUMS OR BOUNTIES, DO ATTEND AT THE SOCIETY'S OFFICE IN THE ADELPHI, ON THE LAST TUESDAY IN MAY, 1788, AT TWELVE O'CLOCK AT NOON, TO RECEIVE THE SAME; THAT DAY BEING APPOINTED BY THE SOCIETY FOR THE DISTRIBUTION OF THEIR REWARDS: AND BEFORE THAT TIME, NO PREMIUM OR BOUNTY WILL BE DELIVERED, EXCEPTING TO THOSE WHO ARE OUT OF THE KINGDOM, OR PREVENTED BY UNAVOIDABLE ACCIDENTS.

IN CASES WHERE PERSONAL ATTENDANCE CANNOT BE GIVEN, DEPUTIES MAY BE SUBSTITUTED TO RECEIVE THE REWARDS.

GENERAL

GENERAL CONDITIONS.

Notwithſtanding the Society reſerve to themſelves the power of giving, in all caſes, ſuch part only of any premium as the performance ſhall be adjudged to deſerve, or of withholding the whole, if there be no merit; yet the Candidates may be aſſured, the Society will always judge liberally of their ſeveral claims.

It is required, that the matters for which premiums are offered, be delivered in without names or any intimation to whom they belong; that each particular thing be marked in what manner each claimant thinks fit, ſuch claimant ſending with it a paper ſealed up, having on the outſide a correſponding mark, and on the inſide, the claimaint's name and addreſs.

No

No papers ſhall be opened, but ſuch as ſhall gain premiums, unleſs where it appears to the Society abſolutely neceſſary for the determination of the claim; all the reſt ſhall be returned unopened, with the matters to which they belong, if inquired after by their marks within two years; after which time, if not demanded, they ſhall be publickly burnt, unopened, at ſome meeting of the Society.

All models of machines, which obtain premiums or bounties, ſhall be the property of the Society.

All the premiums of this Society are deſigned for that part of Great Britain, called England, the dominion of Wales, and the town of Berwick upon Tweed, unleſs expreſsly mentioned to the contrary.

The claims ſhall be determined as ſoon as poſſible after the delivery of the ſpecimens.

No

No perſon ſhall receive any premium, bounty or encouragement, from the Society, for any matter for which he has obtained, or propoſes to obtain a patent.

A candidate for a premium, or a perſon applying for a bounty, being detected in any diſingenuous method to impoſe on the Society, ſhall forfeit ſuch premium or bounty, and be deemed incapable of obtaining any for the future.

The performances which each year obtain premiums or bounties, are to remain with the Society until the end of May, except as mentioned in the conditions annexed to the premiums offered for promoting the Polite Arts.

No member of this Society ſhall be a candidate for, or entitled to receive any premium, bounty, or reward whatſoever, except the honorary medal of the Society.

Where

Where Certificates are required to be produced in claim of premiums, they ſhould be expreſſed as nearly as poſſible in the words of the reſpective advertiſements, and ſhould not be from the candidate, (ſolely) but from ſome other perſon, or perſons, who have a poſitive knowledge of the facts certified.

Where premiums or bounties are obtained, in conſequence of ſpecimens produced, the Society mean to retain ſuch part of thoſe ſpecimens as they may judge neceſſary, making a reaſonable allowance for the ſame.

No candidate ſhall be preſent at any meetings of the Society or Committees, or admitted at the Society's rooms, after they have delivered in their claims, until ſuch claims are adjudged, unleſs ſummoned by the committee.

N. B. Any

N. B. Any information or advice that may forward the deſigns of this Society for the public good, will be received thankfully, and duly conſidered, if communicated by letter, addreſſed to the Society, and directed to Mr. More, the Secretary, at the Society's office, in the Adelphi Buildings, London.

*** In caſe any perſon ſhould be inclinable to leave a ſum of money to this Society, by will, the following form is offered for that purpoſe:

Item. I give and bequeath unto A. B. and C. D. the ſum of upon condition and to the intent, that they or one

one of them, do pay the ſame to the Collector for the time being, of a Society in London, who now call themſelves the Society for the Encouragement of Arts, Manufactures and Commerce; which ſaid ſum of I will and deſire may be paid out of my perſonal eſtate, and applied towards the carrying on the laudable deſigns of the Society.

By order of the Society,

SAMUEL MORE, Secretary.

A

LIST

OF

CONTRIBUTING MEMBERS.

N. B. Thoſe marked with ** pay five Guineas annually; thoſe marked with * Three Guineas annually, thoſe with P are Perpetual Members, thoſe with †† have ſerved the Office of Steward, and thoſe with † are Stewards elect.

A.

** ABERCORN James, Earl of
Aileſbury Thomas, Earl of
Affleck Admiral Sir Edmund, Bart. M. P.
† Andrews Sir Joſeph, Bart. *Shaw, Berks*
Abbott Mr Andrew, *Fleet-ſtreet*
Abbot Lemuel Francis, Eſq. *Ruſſel-ſtr. Bloomſbury*
Adair Alexander, Eſq. *Pall-mall*
Adam James, Eſq. *Albemarle-ſtreet*
Adam Robert, Eſq. F.R. and A.S. *Ditto*

Adam William, Eſq. *Ditto*

Adams Mr William, *Grafton-ſtreet*

Addington William, Eſq. *Clarges-ſtreet, Piccadilly*

Affleck Captain Phillip, *Wimpole-ſtreet, Cavendiſh-ſquare*

Affleck Captain William, *Ditto*

Agace Mr Daniel, *Goldſmith-ſtreet, Cheapſide*

Aguilar Honourable Ephraim Baron, *Broad-ſtreet Buildings*

Alexander Claud, Eſq.

Alexander William, Eſq. *Lincoln's-Inn*

†† Allen John, Eſq. No. 14, *Clements-Inn*

Allen William, Eſq. *Southampton-row*

Almack William, Eſq.

Anderſon David, Eſq. *York-ſtreet, St. James's-ſquare*

Angerſtein John Julius, Eſq. *Pall-Mall*

P Anneſly Honourable Richard, Eſq. *Dublin*

Antrobus Edmund Eſq. *Adam-ſtreet, Adelphi*

Arden Richard Peppar, Eſq, M. P. Attorney General, *Lincoln's-Inn-fields*

Arkwright Sir Richard, *Crumford, Derbyſhire*

Armſtrong Mr Moſtyn John, *Norwich*

Arrow Mr James, *Rocheſter-row, Weſtminſter*

P Aſhby Shukbrugh, Eſq. F.R.S. *Great Ormond-ſtreet*

Aſhton Mr Iſaac, *Arundel-ſtreet*

Aſſer Mr James,

P Aubert

P Aubert Alexander, Esq. F.R. and A.S. *Austin-friars*
Auriol Mr James, No. 17, *Chancery-lane*

B.

P Bute John, Earl of
P Buchan David, Earl of L.L.D. F.R. and A.S.
Bristol Right Rev. Frederick, Earl of, F.R.S.
P Barrington The Honourable Daines, F.R. and A.S. *Temple*

Bruhl His Excellency Count De, *Dover-street*
Berchtold The Honourable Count, *Prague in Bohemia*
P Blackett Sir Thomas Bart.
Blacket Sir Edward, Bart. *Clarges-street*
Bridgeman Sir Henry, Bart. M.P. *St James's-square*
Bridger Sir John, *Combe, Sussex*
Bacon John, Esq. R.A. No. 17, *Newman-street*
†† Bacon John, Esq. *Temple*
Baker John, Esq. *Princes-street, Spitalfields*
Baker Mr John, *Salisbury-square, Fleet-street*
P Barclay David, Esq. *Red-lion-square*
Baring Francis, Esq. M.P. *Mincing-lane*
Baring John, Esq. M.P. *Ditto*
P Barnard Mr William, *Deptford*
Barnard Mr Thomas, *Adelphi*
Barret Mr Bryant, *Strand*
Barron Mr Thomas, *Salisbury-street, Strand*

Bartolozzi Francis, Esq. R.A. *North-end*

Bates John Esq. *Wycombe-Marsh, Bucks.*

Batson Robert, Esq. *Limehouse*

Baverstock Mr James, *Windsor*

Bayley Mr John, No. 2, *High-street, Mary-le-bone*

Baynes Mr John, *Blackfriars-bridge*

Bean Alexander, Esq. *Drury-lane*

†† Beard John Esq. No. 12, *Doctor's Commons*

* Beaufoy Henry, Esq. M.P. F.R.S. *Great George street, Westminster*

Bell William, Esq. *Guernsey*

Bent Ellis, Esq. *Warrington*

Beth Thomas, Esq. *Elm-court, Temple*

Bettesworth Thomas, Esq. *Mark-lane*

Biddulph John, Esq. *Burton-hall, Sussex*

Blades Mr John, *Ludgate-hill*

Blackburne John, Esq. M. P. *Park-street, Westminster*

Blake Mr William, *Aldersgate-street*

Bland John, Esq. *Lombard-street*

Blane Gilbert, M.D. and F.R.S. *Sackville-street*

Blizard Mr William. F.R. and A.S. *Lime-street*

Blofeld Thomas, Esq. *Serjeant's-Inn, Fleet-street*

P Boehm Edmund, Esq. *Sise-lane*

Bond Mr William, *Narrow-wall, New Road, Surry*

Bontein Captain James, *Little Tower-hill*

* Bootle Richard Wilbraham, Eſq. M.P. F.R.S. *Bloomſbury-ſquare*

Boulton Matthew, Eſq. F.R.S. *Soho, near Birmingham*

P Bowdoin James, Eſq.

Bowſer Mr George, *Great Eaſtcheap*

† Boydell John, Eſq. and Alderman, *Cheapſide*

Bramſton Thomas Berney, Eſq. M.P. *Albemarle-ſtreet*

Bramah Mr Joſeph, *Piccadilly*

Braithwaite Daniel, Eſq. F.R. and A.S. *Poſt-Office*

Brand Mr Thomas, *Soho-ſquare*

Bridgen Edward, Eſq. F.R. and A.S. *Paternoſter-row*

Bridges Mr Kemp, Jun. *Charlotte-ſtreet, Rathbone-place*

* Brereton Owen Saluſbury, Eſq. V.P. F.R. and A.S. *Soho-ſquare*

Brehm Major Diederick, *South-molton-ſtreet*

Brickwood Mr Nathaniel, *Caſtle-ſtreet, Thames-ſtreet*

P Broadhead, Theodore Henry, Eſq. *Portland-place*

Brown Mr John, *Holborn*

Brown Mr Joſeph, *George-yard Lombard-ſtreet*

Browne Iſaac Hawkins, Eſq. M.P. F.R.S.

Browne Mr Robert, *King's Mews*

Brownlie John, M.D. *Carey-ſtreet, Lincoln's-Inn*

Brudenell George Bridges, Esq. M.P. *Great George-street, Westminster*

Brummell William, Esq. *Charles-street, Berkley-square*

Bryer William, Esq. *Newman-street*

Bucknall Thomas Skip, Esq. *Conduit-street*

Buggin James, Esq. *Hatton-street*

Bulcock Mr William, *Abroad*

Bullock Thomas, Esq. *Pall-mall*

Burney Mr John, *Star-court, Bread-street*

Burrow Mr Reuben, *East-Indies*

Butts Mr John, *Fleet-street*

Byfield Mr George, *Manchester buildings.*

C.

P Cardiff John, Lord

P Carmarthen Francis, Marquis of, F.R. and A.S.

**Chaulnes Monsieur, Le Duc De, *Paris*

**Cavendish, Lord George

Compton, Lord, M.P.

**Courtenay William, Lord Viscount

Cremorne Thomas, Lord Viscount

P Conway Right Honourable Lieutenant General Henry Seymour, M.P.

Cavendish Honourable Henry, F.R. and A.S. *Gower-street, Bedford-square*

Cadell

Cadell Mr Thomas, *Strand*
Calverley Thomas, Eſq. *Ewell, Surry*
Cameron Donald, Eſq. *Wallbrook*
Campbell Major General Archibald,
Campbell Duncan, Eſq. *Adelphi*
Chambers Chriſtopher, Eſq. *Mincing-lane*
Carpenter Mr Henry, *Panton-ſtreet, Hay-market*
Chandler Henry John, Eſq. *Bentinck-ſtreet*
Changeux Monſieur Pierre Jaques, *Paris*
Charrington John, Eſq. *Mile-end*
Chiſwell Richard Muilman Trench, Eſq. *Portland-place*

† Clarke Richard, Eſq. Alderman, *Bridge-ſtreet, Blackfriars*

Clarke Mr Henry, *Broad-ſtreet*
Clarke Mr Henry, *Gracechurch-ſtreet*
P Clark Mr James,
Clark Richard, Eſq. *Aldermanbury*
Clements Captain John, *Wimpole-ſtreet*
Cloſe Rev. Henry John, *Ipſwich*
Colborne Thomas, Eſq.
Cole Mr Martin, *Channel-row, Weſtminſter*
P Colepepper John Spencer, Eſq.
†† Collins Thomas, Eſq. *Berners-ſtreet*
Colliſon Mr John,
Collinſon Thomas, Eſq.
Compton Mr Henry, *Charlotte-ſtreet, Pimlico*

Conant

††Conant Nathaniel, Esq. *Lamb's-conduit-street*

Coney William, Esq. *Oriel College*

P Coningham James, Esq. *Pancras-lane, Queen-street, Cheapside*

Cooke Benjamin, Mus. D. *Dorset-court, Westminster*

Cooke Rev. Mr James, *Heaton-Norris, near Manchester*

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